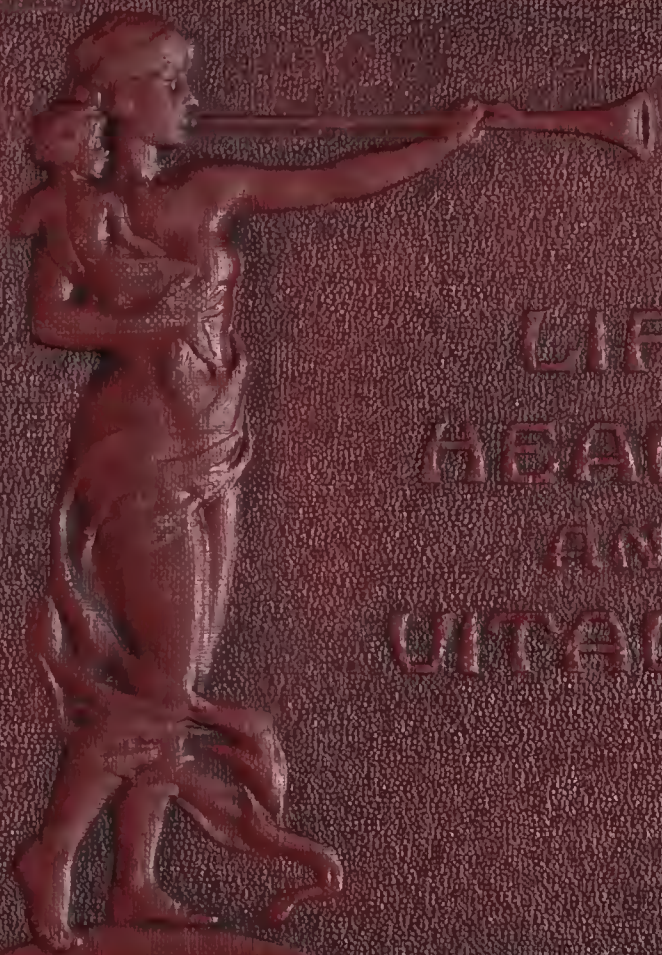


LIFE
HEALTH
AND
VITALITY





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HEALTH AND BEAUTY

HEALTH

THE STANDARD MEDICAL INSTRUCTOR

FOR THE PEOPLE

Concerning LIFE, HEALTH *and* VITALITY

The WONDERFUL STRUCTURE *of the* HUMAN BODY

THE SIZE, SHAPE AND SITUATION OF THE VARIOUS
ORGANS, DESCRIBING THE USES AND FUNCTIONS OF THE
ORGANS AND THE WAY IN WHICH THEY DO THEIR WORK

HOW TO CONQUER DISEASE

THE NURSING AND TREATMENT OF SURGICAL
DISEASES—MEDICAL DISEASES—PREVENTION
AND CARE OF CONTAGIOUS AND OTHER DISEASES

DISEASES *of* WOMEN

SEX LIFE—SEX HYGIENE—SOCIAL EVIL—EUGENICS
MARRIAGE—THE EXPECTANT MOTHER—CHILD-BIRTH

CHILD WELFARE

BABYHOOD—CHILDHOOD—CHILDREN'S DISEASES
THE CARE AND TRAINING OF CHILDREN

The CARE *and* MANAGEMENT *of the* SICK

WHAT TO DO IN ACCIDENTS AND EMERGENCIES
THE JUDICIOUS USE OF MEDICINE

REGISTER *of* USEFUL PRESCRIPTIONS

and a

DICTIONARY *of* MEDICAL TERMS

*Arranged so as to Bring the Subjects within the
Understanding of the People of our Home Life*

By

Professor D. G. REVELL, B. A. and M. D.

Former FACULTY MEMBER RUSH MEDICAL COLLEGE
AND THE UNIVERSITY OF CHICAGO
ASSISTED BY AN ABLE STAFF OF PHYSICIANS

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KEY TO INSTRUCTIONS—VOLUME 2

For Further Reference Consult Index Pages 691 to 703

PART ONE—**SURGICAL**

Two Hundred and Thirty-Six Pages, 1 to 236

Surgical Diseases and Injuries of The Human Body

Treated by Hand, Instrumental Operation or Medical Appliances

Description, Cause and Treatment

INSTRUCTION ONE

Inflammation
Fifteen Pages,
1 to 15

Inflammation from Injuries Requiring Surgical Treatment

Changes in Blood Vessels Termination, Signs of Inflammation,
Symptoms, Causes and Varieties.

INSTRUCTION TWO

Suppuration
Six Pages,
16 to 21

BACTERIAL INFECTION

The Production or Formation of Pus Caused by Microbes.

ACUTE ABSCESS—CHRONIC ABSCESS.

INSTRUCTION THREE

Ulceration
Four Pages,
22 to 25

Chronic and Malignant Ulcers

Cause, Treatment and Variety

INSTRUCTION FOUR

Gangrene
Eight Pages,
26 to 33

Gangrene is Death to a Limited Portion of the Body

Bed Sores, Carbuncles, Boils, Frost-Bite,
Burns and Scalds.

INSTRUCTION FIVE

Sepsis and Infection
Twenty-six Pages,
34 to 59

SEPTIC POISONING

Infection Due to Bacteria or Parasites of Micro-Organisms
which Develop in Living Tissues.

Felon, Erysipelas, Lock-Jaw, Hydrophobia, Tuberculosis, Leprosy.

INSTRUCTION SIX

Tumors and Cysts
Eleven Pages, 60 to 70

Simple Tumors—Cancerous Growths—Cysts

INSTRUCTION SEVEN

Wounds
Nine Pages, 71 to 79

Wounds Requiring Surgical Treatment

INSTRUCTION EIGHT

The Arteries
Two Pages, 80 to 81

Heart Failure—High Blood Pressure

Diseases and Injuries of the Arteries.

**INSTRUCTION
NINE**

The Veins
Seven Pages, 82 to 88

DISEASES OF THE VEINS

Clotting, Plugging, Inflammation, Varicose Veins,
"Birth-Mark" or "Mother's Mark."

**INSTRUCTION
TEN**

Lymphatic Glands
Three Pages, 89 to 91

***How the Lymphatic Glands Extract Poisonous or
Infectious Germs***

Nature Filters Through the Glands and Eliminates Many
Sources of Disease.

**INSTRUCTION
ELEVEN**

Affections of Nerves
Four Pages, 92 to 95

***How the Nerves Become Bruised, Strained,
Ruptured or Compressed***

NEURALGIA, SCIATICA, ETC.

**INSTRUCTION
TWELVE**

Injuries of Bones
Eleven Pages, 96 to 106

Broken or Injured Bones

BROKEN NOSE, FRACTURE OF JAW, BROKEN COLLAR
BONE, Ribs, Arm, Thigh, Knee Cap, Leg, Ankle, Foot, Etc.

**INSTRUCTION
THIRTEEN**

Injuries of Joints
Eleven Pages, 107 to 117

Strains, Sprains and Dislocations of Joints

How Conditions, if Neglected, May Originate Infection.

**INSTRUCTION
FOURTEEN**

*Injuries of Brain
and Membranes*
Four Pages, 118 to 121

Concussion of the Brain

Compression of the Brain and Traumatic Epilepsy.

**INSTRUCTION
FIFTEEN**

Injuries of the Spine
Two Pages, 122 to 123

Sprains and Strains of the Spine

Spinal Meningitis

**INSTRUCTION
SIXTEEN**

Bone Diseases
Five Pages, 124 to 128

Bone Diseases Requiring Surgical Treatment

Inflammation of Bone

**INSTRUCTION
SEVENTEEN**

Diseases of Joints
Ten Pages, 129 to 138

Hip Disease—Tubercular Disease of Joints

INFLAMMATION OF THE JOINTS.

**INSTRUCTION
EIGHTEEN**

Deformities
Thirteen Pages
139 to 151

Various Kinds of Deformities

Wry Neck, Curvature of the Spine, Webbed Fingers, Knock Knees,
Bow Leg, Club Foot, Flat Foot, Hammer Toe, and
Other Deformities.

**INSTRUCTION
NINETEEN***Brain and Head*Twelve Pages,
152 to 163*Diseases of Brain and Head*

Brain Tumors—Abscess of the Brain—Affections of the Face—Affections of the Lips—Cancer of the Lip—Pyorrhea and Other Affections of the Head.

**INSTRUCTION
TWENTY***Mouth, Throat, Etc.*

Nine Pages, 164 to 172

*Cancer and Goitre and Other Affections of the Mouth, Throat and Gullet***INSTRUCTION
TWENTY-ONE***Diseases of the Breast*

Ten Pages, 173 to 182

Cancer and Other Diseases of the Breast

Important Information for Mothers and Daughters.

**INSTRUCTION
TWENTY-TWO***The Spine*

Seven Pages, 183 to 189

Diseases of the Spine

Spina Bifida, Tubercular Disease, Angular Curvature (Hunch-Back), Spinal Abscess.

**INSTRUCTION
TWENTY-THREE***Abdomen*

Ten Pages, 190 to 199

Peritonitis, Affections of the Stomach, Cancer of the Bowel, Appendicitis,

And Other Injuries or Diseases of the Abdomen.

**INSTRUCTION
TWENTY-FOUR***The Liver*

Two Pages, 200 to 201

GALLSTONES

How the Number Varies from One to Many, Occur Most Commonly with Women Who Have Suffered Long from Dyspepsia and Constipation and May Be Associated with Cancer.

**INSTRUCTION
TWENTY-FIVE***Hernia*

Six Pages, 201 to 207

Hernia or Rupture

The Protrusion of an Internal Organ or Part, Through an Unnatural Opening.

**INSTRUCTION
TWENTY-SIX***Intestinal*

Eleven Pages, 208 to 218

Obstructions of the Intestines

Constriction, Twisting, Lodging of Foreign Bodies, Strangulation or Kinking of the Gut, Telescoping, Abscess, Fistula and Cancer of the Rectum, Hemorrhoids or Piles, Falling of Rectum, Etc.

**INSTRUCTION
TWENTY-SEVEN***Kidneys, Etc.*Thirteen Pages,
219 to 231*Surgical Diseases of the Kidneys, Bladder and Urethra*

Floating and Movable Kidney, Stones in the Kidney, Inflammation of the Bladder, Malignant Disease of the Bladder, Various Disorders, Retention of Urine, Urinary Deposits, Stone in the Bladder, Enlarged Prostate Gland, Stricture of the Urethra.

**INSTRUCTION
TWENTY-EIGHT***Diseases of the Testicles*

Four Pages, 232 to 236

Diseases of the Testicles

(Genital Gland of Male)

Retention of, Unnatural Position of, or Misplaced Testicle, Injury, Inflammation, Hydrocele, Varicocele.

PART TWO— **VENEREAL DISEASES**
Ten Pages, 237 to 246

SEX-HYGIENE

Personal Purity and the Social Evil — Words of Warning to Boys and Girls.

Teaching Facts that Keep the Home Life Pure and Clean from the Vice Evil,
and Preventing Ignorance that Makes Victims
of Our Sons and Daughters.

SYPHILIS — A TERRIBLE DISEASE.

**INSTRUCTION
TWENTY-NINE**

The Social Evil

Ten Pages, 237 to 246

THE SOCIAL EVIL

Advice to Fathers, Mothers, Sons and Daughters

Instructions for Women—Girls—Men and Boys.

PART THREE— **OBSTETRICS**
Thirty-five Pages, 247 to 265 (also i to xvi)

— CHILD-BIRTH —

The Expectant Mother—Care of the Mother and the New Born Babe

Supplies for Child-Birth, Complications of Pregnancy, How to Avoid Them.
Signs. Progress and Dangers of Pregnancy and
Probable Time of Labor.

**INSTRUCTION
THIRTY**

Pregnancy

Ten Pages, 247 to 256
(Also see pages i to x,
following page 262)

THE EXPECTANT MOTHER

Signs and Symptoms of Pregnancy, Duration and Management. General Instructions.

**INSTRUCTION
THIRTY-ONE**

Confinement

Three Pages, 257 to 259

The Period of Confinement

LABOR — LACERATIONS AND REPAIRS.

**INSTRUCTION
THIRTY-TWO**

Lying-in Period

Nineteen Pages, 259 to
262
(Also pages i to xvi)

BEFORE THE BABY COMES

How a Baby Is Born

How Conception Takes Place

**INSTRUCTION
THIRTY-THREE**

The Infant

Three Pages, 263 to 265

The Care of the New Born Baby

The Cry of the Infant—Care of the Cord—Failure of Supply of Oxygen
to the Blood—Bathing and Dressing—Clothing—Feeding.

PART FOUR—SEX—LIFE—DISEASES OF WOMEN
 Fifty Pages, 266 to 315

SEX—LIFE—MARRIAGE—EUGENICS

Teaching Parents How to Instruct Children in the Delicate Matter of Sex.

Misguided Parents and Ignorance of the Young People in Our Homes
 Enemies to Sexual Health.

DISEASES OF WOMEN.

**INSTRUCTION
THIRTY-FOUR**

Plain Facts

Thirty-six Pages,
266 to 301

Marriage and Eugenics

Certain Mental and Physical Characteristics Obstacles to Marriage.

Plain Facts for Mothers and Daughters. Transformation of the Girl to Womanhood. Development of Sexual Organs. Happiness of a Woman Impossible Without Physical Perfection. Suppression of Menstrual Flow. Secret Vice. Vice Habit Can Be Cured.

**INSTRUCTION
THIRTY-FIVE**

Secrets of Nature

Five Pages, 302 to 306

How to Tell Children About Child-Birth

A Tactful and Delicate Way. The Beautiful Mysteries of Life.
 How One Mother Told Her Boys About the Mystery of Birth.
 How a Father Explained Child-Birth to His Boy.

**INSTRUCTION
THIRTY-SIX**

Female Diseases

Nine Pages, 307 to 315

DISEASES OF WOMEN

WHAT EVERY WOMAN SHOULD KNOW

Concerning Primarily and Chiefly the Sexual Organs.

PART FIVE—= INFECTIOUS DISEASES =
 Forty-seven Pages, 316 to 364

MEDICAL DISEASES—CONTAGIOUS

How Contagious Diseases May Be Transmitted.

THE GERMS OF INFECTIOUS DISEASE.

**INSTRUCTION
THIRTY-SEVEN**

Introductory

Three Pages,
316 to 318

Meaning of Endemic, Epidemic and Sporadic

Some People Naturally Immune. Great Difference in Susceptibility of Different People.

Four Different Ways That Disease Bacteria May Be Transmitted to the Human Body.

**INSTRUCTION
THIRTY-EIGHT**

Infectious Diseases

Eighteen Pages,
319 to 336

Medical Diseases—Contagious

INFECTIOUS DISEASES CAUSED BY BACTERIA
 AND OTHER GERMS.

Typhoid Fever, Smallpox, Vaccination, Chickenpox, Scarlet Fever, Measles, Diphtheria, Mumps, Whooping Cough. Influenza Cerebro-Spinal Meningitis, Consumption, Plague, Malaria, Intermittent Fever, Ague.

**INSTRUCTION
THIRTY-NINE**

Tuberculosis

Twenty-eight Pages,
337 to 364

Consumption—"Tuberculosis"

Instructions for School Children, Parents and Teachers—Regarding Consumption and Schools—Fresh Air and Sunshine—Consumption is a House Disease.

One-Seventh of Mankind Die of the Great White Plague.

Consumption is a Preventable and a Curable Disease.

PART SIX—**DISEASES NOT INFECTIOUS**
One Hundred and Six Pages, 365 to 470

MEDICAL DISEASES

(Not Contagious)

Rheumatism, Sunstroke, Diseases of the Mouth, Throat, Nose and Lungs.—
Diseases of the Stomach, Inflammation in General, Diseases of
the Intestines, Diseases of the Urinary Organs, Diseases
of the Nervous System, Skin Diseases, Heart
Disease, Hardening of the Arteries.

**INSTRUCTION
FORTY**

Rheumatism

Six Pages, 365 to 370

Rheumatism

Rheumatic Fever—Chronic Rheumatism.

**INSTRUCTION
FORTY-ONE**

Thermic Fever

One Page, 371

Sunstroke or Thermic Fever

INSOLATION.

Cause—Symptoms—Treatment—Prevention.

**INSTRUCTION
FORTY-TWO**

Respiratory Diseases

Twenty-two Pages,
372 to 393

Diseases of the Mouth, Nose, Throat and Lungs

Inflammation of the Mouth, Canker, Quinsy, Sore Throat, Tonsilitis, Laryngitis, Croup. Hoarseness, Loss of Voice, Clergyman's Sore Throat, Bad Odor of Breath, Cold in the Head, Catarrh. How to Avoid Catching Cold, Cough, Bronchitis, INFLAMMATION OF THE LUNGS, Hay Fever, Asthma.

**INSTRUCTION
FORTY-THREE**

Teeth

Five Pages, 394 to 398

THE TEETH

How One Sore Tooth May Throw the Entire Mouth Out of Service.

**INSTRUCTION
FORTY-FOUR**

The Stomach

Eight Pages, 399 to 407

Diseases of the Stomach

ACUTE GASTRITIS—Simple Gastritis, Acute Gastric Catarrh, Acute Dyspepsia, Acute Indigestion. CHRONIC GASTRITIS—Chronic Catarrh of the Stomach, Chronic Dyspepsia. GASTRIC ULCER—Ulcer of the Stomach. Cancer of the Stomach, Dilation of the Stomach, Nervous Pain in the Stomach, Nausea, Vomiting.

**INSTRUCTION
FORTY-FIVE**

Inflammation

One Page, 408

Inflammation in General

Character and Progress.

REDNESS—SWELLING—TEMPERATURE AND PAIN.

**INSTRUCTION
FORTY-SIX**

Intestinal

Ten Pages, 409 to 419

Diseases of the Intestines

Inflammation of the Bowels, Peritonitis, Stools, Color and Nature of the Evacuation, Diarrhea, Constipation, Flatulence, Colic.

**INSTRUCTION
FORTY-SEVEN***Urinary*

Seven Pages, 420 to 426

Diseases of the Urinary Organs

How the Kidneys Separate or Excrete the Urine from the System and
Throw Out and Drain Many Imperfectly Digested and
Useless Matters Derived from the Blood.

Excretion of Urine, Diabetes, Bright's Disease, Albumin, The Bladder, Chronic
Disorders of the Bladder, Stoppage of Urine, Weakness of Bladder.

**INSTRUCTION
FORTY-EIGHT***Nervous System*

Thirty Pages, 427 to 456

Diseases of the Nervous System

Neuralgia, Epilepsy, Saint Vitus Dance, Delirium Tremens, Hysteria, Locomotor
Ataxia, General Paresis, Apoplexy, Melancholy, Hypochondria, Insanity,
Lunacy, Mental Alienation, Unsoundness of Mind, Mania, Dementia, General
Paralysis, Blindness, Sea Sickness, Spasms and Cramps.

**INSTRUCTION
FORTY-NINE***Skin Affections*

Ten Pages, 457 to 466

Skin Diseases and Disorders

Eczema, Ring-Worm, Jaundice, Scald Head, Hives, Freckles, Corns,
Chilblains, Itch, Baldness.

**INSTRUCTION
FIFTY***Circulatory System*

Four Pages, 467 to 470

*HEART DISEASE**Hardening of the Arteries*

Angina Pectoris or Spasm of the Heart, Anemia, Chlorosis (Watery or Thin Blood).

PART SEVEN—FOOD AND SANITATION

—Sixty Pages, 471 to 530—

HOW TO AVOID DISEASE

by Careful Examination of the Food We Eat and the Water We Drink

The Temperature and Moisture of the Air We Breathe.

The Habits We Practice. The Exercises We Take.

Cause and Prevention of Disease. Age and Prolongation of Life.

**INSTRUCTION
FIFTY-ONE***Diseased Animals*

Eleven Pages, 471 to 481

How to Detect Diseased Animals

Important That Traffic In Diseased Meat Should be Stopped.

Symptoms and Features of Principal Diseases Which Affect Animals
That May Be Used for Human Food.

**INSTRUCTION
FIFTY-TWO***Diseased Foods*Twenty Pages,
482 to 501*How to Avoid Diseased Meats and
Decayed Vegetables*

Also Impure Milk, Butter and Other Supplies When
Purchasing from the Dealer.

**INSTRUCTION
FIFTY-THREE***Water*

Five Pages, 502 to 506

Impure Water Supply

Absolutely Pure Water Necessary to Health.

Warning as to Water Supply for Drinking and Cooking.

**INSTRUCTION
FIFTY-FOUR***Temperature—Moisture*

Two Pages, 507 to 509

*Advice Regarding Temperature and
Moisture of Air*

**INSTRUCTION
FIFTY-FIVE**

Cause and Prevention
Three Pages, 509 to 511

What Causes Disease

Under What Conditions We Are Subject To It.

HOW DISEASE IS TRANSMITTED.**INSTRUCTION
FIFTY-SIX**

Age
Two Pages, 512—513

*No Reason Why Man Should Not Live
One Hundred Years***INSTRUCTION
FIFTY-SEVEN**

Precautions
Nine Pages, 514 to 522

*Certain Diseases Can Be Prevented***INSTRUCTION
FIFTY-EIGHT**

Gymnastics
Eight Pages, 523 to 530

*How to Maintain Vigorous Health and Efficiency
by Exercise*

How to Keep Supple and Keep the Muscles Flexible.

PART EIGHT — **CARE OF THE SICK** —

Fifty-seven Pages, 531 to 587

*Care and Management of the Sick***INSTRUCTIONS FOR NURSING.**

The Administration of Food and Medicine. How to Feel the Pulse, Take the Temperature and Count the Respirations. Directory of General Information for Those in Charge of Patient. Disinfection and Fumigation of the Sick Room.

**INSTRUCTION
FIFTY-NINE**

Nursing
Seven Pages, 531 to 537

Requirements of a Nurse

The Five Virtues, Intelligence, Cleanliness, Firmness, Gentleness and Patience. Nurses for the Sick, Professional Training of Nurses, Nursing a Skilled Art.

**INSTRUCTION
SIXTY**

The Sick Room
Ten Pages, 538 to 547

General Instructions for the Sick Room

Obeying the Doctor's Orders. Medicine, Food, Injections, Reading to Patients. Quiet to be Observed.

**INSTRUCTION
SIXTY-ONE**

Observation
Ten Pages, 548 to 557

*The Three Vital Signs in Observing the
Patient's Condition*

What the Nurse Must Report to the Doctor.
How to Feel the Pulse, take the Temperature and Count the Respirations.

**INSTRUCTION
SIXTY-TWO***Preparation*

Three Pages, 558 to 560

*What to Do and How to Prepare for Cases
of Sudden Illness***INSTRUCTION
SIXTY-THREE***Directory*

Eight Pages, 561 to 568

*Directory of General Information for Those
in Charge of a Patient*

How to Wash, Bathe and Sponge the Patient. The Application of Mustard and Other Poultices. How to Apply Hot Bottles. When and How to Give a Child a Warm Bath. A Simple Method of Applying Moist Heat. How to Apply Friction to the Body. Quick Way to Give a Hot or Cold Douche. The Proper Method of Placing Cold Applications to the Head. How to Give and Prepare Enemas, for the Injection of Fluid into the Bowels.

**INSTRUCTION
SIXTY-FOUR***Helpless Patients*

Four Pages, 569 to 572

*Complete Instructions on How to Nurse, Assist,
Lift, Move and Feed Helpless Patients***INSTRUCTION
SIXTY-FIVE***Fever Patients*

Eleven Pages, 573 to 583

Care of Fever Patients

Slight, Moderate, High and Very High Fevers.

The Course and Termination of a Fever.

**INSTRUCTION
SIXTY-SIX***Self Control*

Four Pages, 584 to 587

*Presence of Mind and Self Control While
Waiting for the Doctor*

The Physician's Orders Should Be Explicitly Followed.

Keep Quiet in Emergency.

PART NINE — THERAPEUTICS —

Ninety-two Pages, 588 to 679

*The Use and Action of Medicines and Other
Curative Measures*

LIGHT, HEAT, ELECTRICITY, Etc. USEFUL PRESCRIPTIONS

**INSTRUCTION
SIXTY-SEVEN***Curative Measures*

Seven Pages, 588 to 594

How Medicines Are Administered

The Meaning of Abbreviations Used by Physicians in Writing Prescriptions.

**INSTRUCTION
SIXTY-EIGHT***The Medicine Chest*

Five Pages, 595 to 599

*Simple Remedies May Save a Long Illness if
Applied at the Right Moment*

Articles and Remedies That Every Household Should Be Provided With At All Times.

**INSTRUCTION
SIXTY-NINE**

Prescriptions
Twenty Pages,
601 to 620

A Register of Useful Prescriptions

INSTRUCTIONS AS TO THE USE AND
ABUSE OF MEDICINES.

**INSTRUCTION
SEVENTY**

Tonics
Fourteen Pages,
621 to 634

Tonics and Other Remedies

How To Improve Health and Increase Vigor.

**INSTRUCTION
SEVENTY-ONE**

Old Age
Two Pages, 635 to 636

Guide for Those Approaching Old Age

The Time When Vigor of Life is Giving Way and Effects of Excesses
in Early Life Add to Natural Infirmities

**INSTRUCTION
SEVENTY-TWO**

Patent Medicines
Two Pages, 637 to 638

**Warning As to Purchase and Use of Patent
Medicines and Drug Foods**

With Table Giving Alcoholic and Other Analysis of Their Approximate
Constituents.

**INSTRUCTION
SEVENTY-THREE**

Massage
Nine Pages, 639 to 647

How to Give Massage and Baths to Patients

The Wonderfully Soothing Influence of Massage in Nervous Exhaustion.

A LESSON IN GIVING MASSAGE.

**INSTRUCTION
SEVENTY-FOUR**

Diet
Seven Pages, 648 to 674

One Man's Meat Is Another Man's Poison

Do You Know What Is Indigestible and What Is Not?

Nutritive Principles—Problems of Diet

The Different Foods for People of Various Ages.

**INSTRUCTION
SEVENTY-FIVE**

Diet
Two Pages, 675 to 676

THE THINGS WE EAT

ARTICLES OF FOOD FROM THE VEGETABLE KINGDOM.

**INSTRUCTION
SEVENTY-SIX**

Diet
Three Pages, 677 to 679

THE THINGS WE EAT

VARIETIES OF FOOD FROM THE ANIMAL KINGDOM.

GLOSSARY

Nine Pages, 681 to 689

DICTIONARY OF MEDICAL TERMS

Giving the Meaning in Such Language as to Bring the Subject Within
the Understanding of the People of Our Home Life.

REFERENCE INDEX

(For Volume Two Only)
Thirteen Pages, 691 to 703

INDEX TO ILLUSTRATIONS.

(Consult also Index to Illustrations, Vol. I.)

	PAGE		PAGE
Abscess	17, 18	Diphtheria germs	face 316
Air pressure	358	Diplococci	8
Anal fistula	212	Disease germs.....	8, face 316
Aorta	frontispiece	Disease in pork.....	479
Armpit, lymph glands.....	face 266	Dislocations—	
Arteries, wounds of.....	80	Hip.....	109, 113, 114, 115, 117
Asiatic cholera germs.....	face 316	Elbow	116
		Duct of Botallus.....	frontispiece
Bacilli.....	8, face 316	Ductus venosus	frontispiece
Backbone curves	142		
Bacteria.....	8, face 316	Elbow dislocated	116
Barometer	358	Embolus	82
Blood, circulation of before birth...		Enamel	396, 397
.....	frontispiece	Enlarged prostate	229
Blood clot	44, 82		
— in inflammation	3	Falling of bowel.....	217
Bow leg.....	145, 146	Fistula-in-ano	212
Bowel, falling of.....	217	Foot deformed	148
Breast cancer	180	Forearm fracture ..	100
Breast, lymphatics of.....	face 266	Fracture, collar bone.....	99
Broken collar bone.....	99	— Colles'	100
— leg	106	— compound	106
— thigh bone	102	— forearm	100
		— greenstick	100
Calculus	221, 227	— impacted	101
Callus	100	— jaw	97
Cancer of breast.....	180	— leg	106
Carotid artery	face 266	— patella	104
Cholera germs	face 316	— thigh	101, 102
Circulation before birth....	frontispiece	Fungus	8
Cleft palate	167		
Clinical thermometer	550	Gathering	17, 18
Club foot	148	Germes of diseases.....	8, face 316
Cocci. ..	8	Glands, lymphatic	face 266
Colles' fracture	100	Granulation	75
Compound fracture	106	Greenstick fracture	100
Congenital hip dislocation.....	109		
Cord, umbilical.....	frontispiece	Harelip	167
Crystals in urine.....	421, 422	Healing.....	74, 75, 76
Cure for helpless.....	572	— by first intention.....	74
Cure for consumptive.....	340	— — second intention.....	75
Curvature of spine.....	140, 184, 186	Heart before birth.....	frontispiece
Curves of backbone.....	142	Hemorrhoids	215
		Hernia, truss for.....	203, 204
Deaths from diseases.....	337	Hip disease.....	135, 136, 137, 138
Deformed foot	148	Hip-joint dislocation..	109, 113, 114, 117
Diagram of deaths from consumption		Hodgen's splint	103
.....	337, 338	Hollow in upper jaw.....	395
Diagram of healing wound.....	75	Hot cloths, to wring.....	564

	PAGE		PAGE
Hunch back	156	Scoliosis	140
Hydrophobia	50	Skin cancer	66
Impacted fracture	101	Socket of tooth.....	395, 397
Invalid's cup	572	Spinal curvature.....	140, 184, 186
Ivory	396, 397	—disease, to treat.....	189
Jaw	395	Spirilla	8
—fractured	97	Spirochaete	face 316
Jugular vein	face 266	Spit cup	340
Jury mast	189	Splint	102, 103
Knock-knee	145, 146	Spores	8
Lips, deformed	167	Staphylococci.....	8, face 316
Liston's long splint.....	102	Stone in the bladder.....	221, 227
Lymphatics of head, neck and chest face 266		Streptococci.....	8, face 316
Mad dog	50	Structure of tooth.....	396, 397
Micrococci	8	Teeth	395
Micro-organisms.....	8, face 316	Thermometer	550
Mould	8	Thigh bone fractured.....	101
Mouth, deformed	167	Thrombus	82
Natural curves of backbone.....	142	To reduce dislocated hip.....	115, 117
Neck, lymphatics of.....	face 266	To treat hip disease.....	137, 138
Needle in thumb.....	72	—spinal disease	189
Obstruction of urine.....	229	To wring hot cloth.....	564
Oval foramen	frontispiece	Tooth	396, 397
Oxalate of lime.....	422	Trichina	479
Palate, cleft	167	Truss	203, 204
Pest germs	face 316	Tuberculosis germs	face 316
Phagocytosis	10	Tuberculosis of hip.....	135, 136
Phosphates in urine.....	421	Tuberculosis of spine.....	184, 186
Piles	215	Typhoid fever germs.....	face 316
Plague germs	face 316	Uleer, rodent	66
Pocket spit cup.....	340	Umbilical cord	frontispiece
Pork, diseased	479	Urethra	227, 229
Potts' disease	184	Uric acid.....	227, 422
Prolapse of bowel.....	217	Urinary calculus.....	221
Prostate, enlarged	229	—deposits	421, 422
Pulp of tooth.....	397	Varicose veins	85
Pyemia	44	Vein, jugular	face 266
Rabies	50	Veins, varicose	85
Relapsing fever germs.....	face 316	White blood cells.....	3, 10
Rodent ulcer	66	Wound	75
Sarcinae	8	Wounds of arteries.....	80
Sediment in urine.....	421, 422	Wrist drop	93
		X-ray	72
		Yeast	8
		Zooglea	8

STRICTLY ETHICAL

NOTE: THE CONTENTS OF THIS WORK AND "THE INSTRUCTIONS" GIVEN ARE STRICTLY ETHICAL AND SUCH AS EVERY GOOD PHYSICIAN AND SURGEON DESIRES TO SEE IN THE POSSESSION OF HIS PATIENTS SO THAT THEY MAY INTELLIGENTLY FOLLOW HIS PRESCRIBED RULES.

THESE INSTRUCTIONS SHOULD FORM A PART OF THE EDUCATION OF ALL.

IGNORANCE OF THE STRUCTURE AND FUNCTIONS OF THEIR OWN BODIES, OF THE REQUIREMENTS OF THEIR OWN CONSTITUTIONS AND OF THE TRUE PRINCIPLES ON WHICH SOUND HEALTH IS TO BE PRESERVED, MUST BE OVERCOME BY PLACING THE NECESSARY KNOWLEDGE BEFORE THE PEOPLE IN THE FORM OF SPECIAL INSTRUCTIONS.

THE EXTENSIVE DIFFUSION OF SUCH KNOWLEDGE CAN AND WILL PUT AN END TO PREVAILING IGNORANCE.



A SERIOUS CASE

If this heart-broken Mother had only Possessed a knowledge of the Present Day Instructions on "Prevention and Care" this "Serious Case" might have been avoided.

PART ONE—*Surgical*
(Pages 1 to 236)

Surgical Diseases and Injuries of *The Human Body*

Treated by Hand, Instrumental Operation or Medical
Appliances

Description, Cause and Treatment.

INSTRUCTION ONE—*Inflammation*

"Inflammation is the succession of changes which occur in a living tissue when it is injured, providing the injury is not of such a degree as to at once destroy its structure and vitality." The term "injury" includes bacterial invasion, the commonest cause of the inflammatory process. Formerly inflammation was looked on as always of a destructive and harmful nature, but at the present time it is regarded as often rather, of a protective or conservative character, being Nature's means of limiting, or stopping, the advance of noxious micro-organisms, and of finally removing them from the body. It is associated with a condition of diminished vitality of the part whereby the living tissue is in danger of destruction, or of such changes as will render it incapable of again maintaining its former functions. The primary lesion¹ is one of the walls of the blood-vessels, and would look on inflammation as a disturbance of the equilibrium normally maintained between the vessel walls and the vessel contents, whereby the latter are enabled to escape into the tissues about the vessels, and there produce the effects so commonly seen in inflamed parts.

The actual phenomena of inflammation may perhaps best be studied in the web of a frog's foot. If this is spread out and examined under the microscope, the following evidences of physiological activity may be seen: (a) the flow of blood through the vessels, as indicated by the movement of the corpuscles, the red ones, each separate from the other, flowing in the central current, the leucocytes, or white blood cells, only occasionally seen amongst the red, or here and there one may be noticed rolling lazily along in the side of the tube; (b) the constant changes in caliber of the arterioles² inde-

¹ *Lesion* means injury of any kind.

² *Arterioles* are the smallest arteries.

pendent of the heart's rhythmical action, and influencing in a marked degree the flow through the capillaries; and (c) the changes which occur in the **pigment-cells**, which represent the **connective tissues** of the part. These latter changes are mainly due to the influence of light, the cells contracting or expanding as the light is increased or diminished.

If now a crystal of common salt, or some such irritant, is applied to the web, the early phenomena of inflammation may be readily observed.

I.—The Changes in Blood-vessels in Acute Inflammation.

A momentary contraction may perhaps be noticed in the arterioles of the part, but this is only apparent in inflammations produced artificially, and is of no known significance. It is followed by a condition of **Hyperemia**¹ of the inflamed area, a **rapid and lasting widening of the vessels**, accompanied by an increase in the rapidity of the blood-flow (**acceleration**). This increased rapidity of the flow lasts for a while, and then the current gradually becomes slower and slower (**retardation**), as if an ever-growing obstruction existed to the passage of the blood; then a period of **oscillation** will be noticed, the blood-current swaying forwards and backwards, and finally a condition of **stasis** or "still-stand" is arrived at, which may or may not end in actual **thrombosis** (**coagulation**, or clotting, **within the vessels**). During this period considerable changes have occurred in the behavior and condition of the vessel contents. Thus, almost as soon as the dilatation of the vessels occurs, the leucocytes tend to collect along the walls, seeming, as it were, to fall out of rank. This process first commences in the veins, but can be observed in all the vessels. The red corpuscles also, which formerly had flowed along separately, now tend to adhere to each other, and to the vessel walls, running into rouleaux, or masses like rolls of coins.

The second factor in the vascular changes is **Exudation**, a proceeding which becomes evident at a very early stage. Every element in the constitution of the blood participates in this process. The white cells are the first to pass through the vessel walls, especially those of the smaller veins and capillaries. The process is a strictly **vital** one, brought about as follows: A small arm or outgrowth of the leucocyte is inserted between the cells lining the vessel, whose cohesion has been probably interfered with by the inflammatory

¹ *Hyperemia* is excess of blood in the blood vessels, which are therefore more distended than usual.

process. Into this arm the protoplasm, or living substance, of the white cell flows, still further separating the parts of the vessel wall, and thus the cell passes through the wall into the connective tissues without. When once the white corpuscle has migrated into the tissues around the vessels, it may undergo various changes which have only recently been clearly made out. Thus, it may die or be

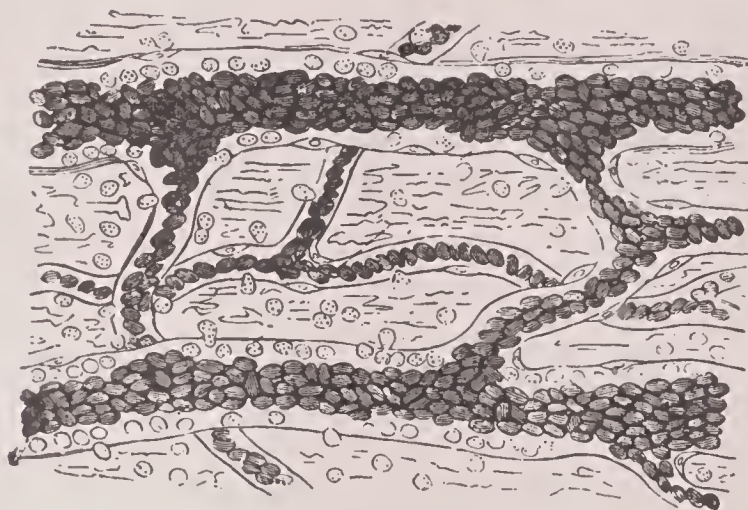


Fig. 244.

Diagram to show an early phase of inflammation. Two small veins are shown and several capillaries. The red blood cells still occupy the central part of the vessels; the white cells have become very numerous along the walls within the vessels; some are passing through the vessel wall, while others have already escaped into the tissues. The walls of vessels as small as these are very thin.

broken up at once, setting free fibrin ferment, and assist in the production of the inflammatory clot to be shortly described; or, again, it may serve as food for the larger cells which soon make their appearance, arising apparently from the multiplication of the connective-tissue corpuscles in the neighborhood; or, once more, some of the exuded cells are likely to find their way back again into the circulation through the lymphatics, and others may be transformed into pus corpuscles; whilst still many of them prior either to disintegration or transformation into pus corpuscles have a function to fulfil in attacking and removing any dead tissue which may exist in the neighborhood of the inflammatory focus, whilst they also have a phagocytic function (i. e., microbe-destroying). In fact, the leucocytes may be looked on as the scavengers of the body, or as advanced guards, which, at the first onset of mischief, are thrown out from the vessels as Nature's first line of defense against the invading forces, their chief duty being to remove all damaged and noxious materials, and then, having limited the spread of the destructive process, they in turn give place to the larger and more useful "fibroblastic" cells which are the active agents in the process of repair.

The **red corpuscles** pass through the walls of the capillaries as a **result of simple mechanical pressure**; this usually only occurs in very acute attacks. When once external to the vessels they are broken up and their coloring matter diffused abroad, and no further part is known to be played by them.

The **liquor sanguinis**, or liquid part of the blood, is also **extravasated** (i. e., escapes from the vessels). This is merely an **exaggeration of a normal process**.

Terminations of Acute Inflammation.

These vary according to the cause of the mischief and the intensity of the process.

1. **Resolution**, or the restoration of the part to its natural condition and function. This can only occur when the injury has not been so severe as to destroy the vitality of the affected tissues, and when the **vascular changes have not gone further than stasis**.

2. **Thickening** occurs when the inflammatory process is not arrested until after the occurrence of **thrombosis**, but has stopped short of suppuration. The parts under these circumstances cannot be restored to their original condition, but changes take place which result in formation of **scar-tissue**.

3. **Suppuration** is always due to the invasion of the affected region by certain pyogenic¹ organisms, which act in such a manner as to **disintegrate and liquefy the tissues** involved.

4. **Ulceration** is produced by the action on the surface of either skin or mucous membrane of an irritant of such nature and intensity as to **destroy its vitality**, though without evident **sloughing**, or casting off of dead tissue.

5. **Gangrene** is a less common result of inflammation, and is due either to the **activity of the virus** (i. e., poison of the agent causing the inflammation) or the **weakness of the tissues** attacked.

Signs of Inflammation.

These are **heat, pain, redness, swelling, and impairment of function**.

Heat.—An inflamed part feels hot to the touch, and the temperature is raised above that of the surrounding skin. The cause of this is the **increased amount of blood** flowing through it.

Pain.—This is due to the **irritation of the peripheral nerve terminals**, both by the **increased arterial tension**, and by the **pressure of**

¹ *Pyogenic* means pus-forming.

the exudation, so that it is much increased if, from the density of surrounding structures, swelling cannot readily occur, e. g., in the palm of the hand, or in the eye.

The special feature of inflammatory pain is that it is always increased on pressure, whether by increasing the blood-pressure or from external agencies. Thus, if an inflamed finger or hand is allowed to hang down, the pain is much increased, whereas elevation of the part causes speedy relief.

The pain of suppuration is throbbing in character; of an inflamed mucous membrane, scalding, burning, or gritty; of an inflamed serous membrane, stabbing; of inflamed bone, aching or boring, and often worse at night; of an inflamed testicle, sickening. When the organs of special sense are inflamed, there may be little real pain, but much disorder of the special sense, e. g., flashes of light in inflammation of the retina and noises in the ears in inflammation of the inner ear.

The pain is not always limited to the inflamed part, but is often experienced also in distant regions, either through a similarity of nerve-supply or from the fact that a sensory stimulus is always referred by a patient to the end of the affected nerve. For example, in hip disease the chief pain is often felt in the knee, because the two joints have a similar nervous supply.

Redness is due to the hyperemic, or full-blooded condition of the inflamed part; it is, of course, only present when tolerably superficial regions are involved, and its intensity varies with the stage of the inflammatory process. In the early active hyperemia the color is a bright rosy-red, fading rapidly on pressure, and returning equally quickly. In the stage of retardation the redness is more dusky, since the blood is longer in passing through the capillaries, and so becomes more deprived of oxygen; the color does not disappear or reappear so rapidly, and a slight yellowish tinge often remains from extravasated hæmoglobin, or coloring matter of the red corpuscles. When stasis is reached pressure will not remove the red color, and, should such a state persist for long, definite and permanent pigmentation, or discoloration, of the part may remain.

Swelling is the last of the signs of inflammation, and is due to the same two causes, viz., the hyperemia of, and the exudation into, the part. Necessarily the amount of swelling depends upon the acuteness of the disturbance, and the distensibility of the tissue, and in measure it varies conversely with the amount of pain. In some cases where the inflamed area is covered by a thick and firm fascia, not only is the pain very considerable, but swelling may occur away from

the inflamed area, e. g., over the back of the hand in **palmar abscess** (abscess in the palm of the hand).

Impairment or Loss of Function is another important sign of inflammation, and is due not only to the **paralyzing effect** of the process upon the function of the part, but also in measure to the **pain which is often elicited by attempting to use it**. Thus an inflamed eye can see but little; a muscle, when inflamed, is naturally kept at rest; glandular organs, e. g., the liver and kidneys, have their functions, if not lost, at least much diminished.

General or Constitutional Symptoms of Inflammation.

These may be of a serious character, if the organ affected is an important one, such as the kidneys or heart; but such conditions we cannot discuss here. The general symptoms of local inflammation of parts, not of vital importance, may be written in one word, viz., **Fever**, or pyrexia. The general characteristics of fever are: a **greater or less elevation of temperature**, accompanied with a corresponding **acceleration in the rate of the heart-beat and of the respirations**. If it continues for any time, the **patient becomes thin, emaciated**, and loses muscular power. The mouth is dry, and the tongue furred; and in the later stages, where a fatal issue is apprehended, the lips and teeth are usually covered with **sordes** (or accumulations consisting of dried mucus and food debris). The **appetite is impaired, digestion is imperfect**, and the **bowels constipated**; any motion passed is exceedingly offensive. The **urine is scanty and high-colored**. The **skin of a febrile patient is often dry**, but by no means necessarily so.

Leukocytosis.—The white corpuscles are increased in number in all inflammatory affections which go on to suppuration, especially if the pus is pent up in a cavity. This increase in the numbers of white blood cells is known as **leukocytosis**.

The terms **crisis** and **lysis** are applied to the terminations of fever, the former implying a rapid disappearance of the fever, accompanied usually by what is known as a "**critical evacuation**," either from the **skin, bowels, or kidneys**; the latter term indicates a gradual return of the temperature to normal.

Causes of Inflammation.

A. Predisposing Causes.—The conditions which predispose to inflammation may be conveniently divided into the local and the constitutional.

The **local causes** include the following more important conditions:

1. **Defective circulation**, whether due to chronic anemia, as in a limb with rigid calcareous arteries, or to passive congestion, as in a leg with varicose veins.
2. **Loss or impairment of the nervous supply** to a part, rendering it less resistant to external irritation either from loss of sensation, diminished control of the nervous centers, or circulatory changes.
3. **One attack** of inflammation often leaves a part weaker and more liable to recurrence.

The **general or constitutional predisposing causes** are those which tend to depress the general vitality, e. g.:

1. **Old age**, where the body as a whole suffers in its nutrition.
2. **Weak action of the heart**, disturbing the vascular supply of the organs and members of the body.
3. An **unhealthy condition of the blood**, as from (a) the addition of some **abnormal constituent**, as in alcoholism, plethora, lead, mercury, or phosphorous poisoning, septic diseases, diabetes, etc.; (b) the **insufficient elimination** of excreta, as in Bright's disease or gout; (c) the **absence of some normal constituents**, as in albuminuria or anemia.
4. The presence of some **constitutional disease**, as syphilis, tuberculosis, rheumatism, etc.

B. **Exciting Causes.**—The active agent in the production of any inflammation is the existence of some **irritant** which acts for a shorter or longer period upon the tissues. The different forms of irritants are infinite in number, but may be grouped under the following four headings:

1. **Mechanical or traumatic** causes, such as direct violence, friction, tension, pressure, etc.
2. Causes which act through **changes of temperature**, either heat or cold.
3. **Electricity**, either in the form of the faradic or galvanic current, or through the agency of lightning, or the strong currents used for lighting purposes.
4. **Toxic irritants**, under which may be included:
 - (a) **Chemical** agents, such as strong acids or alkalies.
 - (b) **Vegetable** irritants, e. g., croton-oil, oil of mustard, etc.
 - (c) **Animal** irritants, such as cantharides, and insect or reptile bites.
 - (d) The development of **micro-organisms** within or without the body.

Bacteria are almost universal in their distribution. Earth, air, and water are full of them, and especially so in populous neighborhoods. The greater the number of the inhabitants, the larger the number of organisms in the air. On the high Alps, and in isolated, especially mountainous, districts, there are comparatively few, whilst in the air of a crowded hospital ward swarms of them are present, and these often of a most dangerous type. The surface of our bodies and the intestinal canal, moreover, teem with them, although in a healthy individual the solid organs, the blood and lymph, are practically free. Any condi-

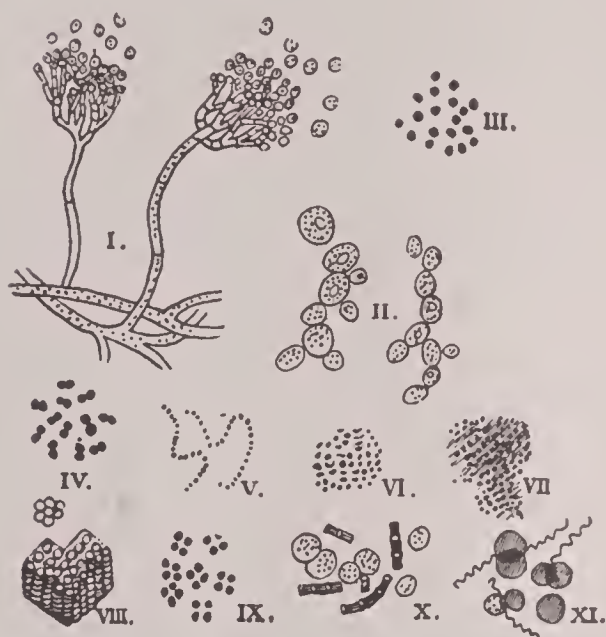


Fig. 245.

Some examples of *microorganisms* (or minute living things):
 I. A thread-like *fungus* (mould) with spores forming, by which it is propagated; ringworm, thrush, barber's itch, and actinomycosis (or "lumpy jaw" in cattle) are a few of the diseases due to fungi. The spores are like very fine dust. II. A kind of *yeast*; the cells multiply by budding off small pieces. Yeasts cause fermentation. III. Single or isolated *cocci* (berry-like bacteria). IV. *Diplococci* (or double cocci). V. *Streptococci* (chain cocci); this is the common cause of boils and carbuncles. VI. *Staphylococci* (cluster cocci). VII. *Zooglyca* or jelly like mass of bacteria. VIII. *Sarcinae* or bale-like bacteria. IX. Cocci arranged in fours; a single cocci divides into two, each of which again divides, thus forming four. X. *Bacilli* (rod like bacteria); this is the form of the germ that causes tuberculosis, and the germ of diphtheria, of anthrax and of lockjaw. XI. *Spirilla* (spiral germs) lying beside red blood cells; this is the form of the germ that causes remittent fever.

tion of general weakness will facilitate their entrance into the system, or perhaps one should say, will diminish the resistance of the body to their presence and activity, and hence lay the individual open to the occurrence of diverse infective diseases.

Results of Growth.—The activity and development of bacteria are physiological phenomena, carried out in accordance with the general laws governing animal and vegetable life, and requiring certain definite conditions to be present. The pabulum or food-stuff differs with the particular species, and the results of their growth vary in like manner. As to their environment in pathological conditions, they are divided into two great classes, according to whether or not they can develop in the living tissues. The **pathogenic or parasitic** bacteria can do so, producing what are known as "infective" diseases; but when an organism can develop only in dead tissues, such as masses of slough, or in exudations of blood, serum, or pus, or in some non-living nutrient material, it is called a **non-pathogenic, saprophytic, or carrion** microbe, and the process set up is termed "septic." Occasionally, however, some of the pathogenic organisms are capable of continuing their development in dead tissues, and this property is one of great danger, in that it permits of extensive diffusion of the virus; the tetanus, anthrax, and

malignant œdema bacilli are specially characterized by this property. The necessity for atmospheric air in their development constitutes the basis of the division of microbes into *ærobic* and *non-ærobic*. When they can grow in, and, indeed, require for their development, the actual presence of free air, they are termed *obligate ærobes*. If, however, they have the power of acquiring the oxygen they need from the nutrient tissues surrounding them, they are then known as *facultative ærobes*. *Anærobic* organisms are those which require an atmosphere around them, from which oxygen is rigidly excluded, and such usually flourish best in nitrogen or hydrogen, e. g., the bacillus tetanus. All bacteria consume oxygen, and give off a larger or smaller amount of carbonic acid; but in addition certain special compounds are produced as the result of their growth, and at the expense of the surrounding pabulum. *Pyogenic*, or *pus-producing* bacteria, can liquefy the tissues and so form pus.

The most important products, however, of bacterial activity are the so-called *Toxins*, or poisonous bodies, the presence and action of which determine the special features of most of the infective diseases.

Methods of Examination.—These are in the main threefold:

1. **Microscopic Examination.**—High powers of the microscope are needed for this work, and even with them it is often difficult to determine the characters of any particular form of microbe under examination.

2. **Cultivation** on various nutrient is of the greatest assistance in determining the exact nature of any special organism under examination. For this purpose the cut surface of a raw potato after sterilization of the exterior suits excellently in many cases. Fluids, such as meat infusion, milk or blood serum, are not very satisfactory; but similar materials, solidified by the addition of gelatine or agar-agar,¹ and either placed in test-tubes or on plates, are the most suitable

¹Agar-agar is a kind of gelatine got from sea-weed.
nutrient bases.

3. **Inoculation** experiments are really the most reliable means of examining into the relations of micro-organisms to any particular disease; but it must be always fully recognized that animals are not necessarily affected in the same way as man, and therefore a bacteriologist must also be somewhat of a comparative pathologist. The importance of this means of investigation has been emphasized by Koch, who has insisted on the following four essentials in order to prove the infective character of any particular disease:

- (i.) The organism must be present in every case of the disease, either in the tissues or in the blood.
- (ii.) It must be possible to cultivate it for many generations apart from the body.
- (iii.) Its inoculation into a suitable animal must be followed by the appearance of the specific disease; and
- (iv.) The organism must be found in the tissues or blood of the animal infected in this manner.

The question of *Immunity* from infective diseases has been, and still is, receiving the greatest attention from bacteriologists. Three different kinds of immunity exist, viz.:

(a) **Natural immunity**, by which is meant that certain individuals or animals are capable of resisting the action of microbes, which can develop in others; thus, rats are unharmed by anthrax bacilli, and goats by those of tubercle. This con-

dition also obtains in the human subject where certain individuals seem to be immune against particular diseases.

(b) **Acquired immunity** is that condition in which an individual is free from the danger of contracting a specific disease owing to his having already had it. Thus, one attack of any of the ordinary rash-fevers (measles, etc.) or of syphilis, as a rule, protects him from further danger from that special affection. Occasionally, however, this immunity seems to wear itself out, and second attacks may then occur.

(c) **Artificial immunity** is the protection against infection which is obtained by artificial means, devised and designed by science. Various plans have been introduced to effect this object, of which the following are the most important: (i.) **Inoculation with the specific disease in such a way and at such a time that the patient can readily throw it off.** This was formerly employed as a preventive against small-pox, but not with particularly great success. (ii.) **Inoculation with an attenuated or modified virus, which, whilst not giving the patient the original disease, has yet such an effect on his constitution as to protect him from it.** This has been used with good results in the prevention of anthrax in animals. (iii.) It is probable that most organisms have the power of stimulating the body to form materials of the **antitoxin type, which are capable of inhibiting** the development of the bacteria, and it is the great aim of bacteriologists to isolate such substances, so as to place them at the disposal of the practitioner. The **serum** of immunized animals contains this substance, and has been employed as a curative agent in several diseases, as well as for protective purposes. (iv.) **Inoculation with the virus of some other disease** is possibly a means of prevention or cure, as in the case of vaccination to prevent small-pox, although there is a certain amount of doubt as to whether or not the two conditions are identical.

Resisting or Antiseptic Power of the Tissues.—If we are surrounded with, and if our bodies even are invaded by, so great a swarm of enemies, many of which could under suitable circumstances



Fig. 246.

Three stages of *phagocytosis* (the eating or destruction of disease germs or other harmful objects, by white blood cells). In the first figure the rod-shaped organism is partly enclosed or swallowed, in the second it is wholly so, and in the third it is partly digested. This illustration also shows the *nucleus* of the cell, and how the shape of the cell changes during the so-called ameboid movements.

produce grave diseases, there must be present within us some potent natural means of resisting their activity, and such is termed the **antiseptic or germicidal power of the tissues**. Bacteria are destroyed in the body; some are possibly excreted by the kidneys, but of this we know but little. There are two main theories as to Nature's

means of destroying or preventing the action of bacteria in the body, viz.: (1) **Metchnikoff's theory of Phagocytosis**, which maintains that the leucocytes have the power of taking into their substance the microbes, and of there **destroying them by a process of digestion**. This idea is based on the results of microscopic examination, it being tolerably easy to demonstrate the presence of bacteria within the living leucocyte, although opponents to this theory suggest that it is only the dead organisms which are swallowed and dealt with in this way. (2) More recently the theory of phagocytosis has been very vigorously attacked, and it has been maintained that **the chief germicidal powers of the body reside in the blood serum and its constituents**. Certain special albuminous substances have been isolated, and to these the name of **Protective Albumins or Alexines** has been given. Probably there is truth in both these theories, the two different powers being called into play under varying circumstances.

Varieties of Inflammation.

A **Catarrhal** inflammation is one affecting mucous membranes, evidenced clinically by the occurrence of **redness**, and a **burning or scalding pain**, which is most marked in the early or dry stage, when there is but little discharge, and is much diminished in the later stages, when there is **free secretion of mucus, muco-pus, or pus**. This form of inflammation may be caused by bacteria, but is often due to the action of local irritants, or to what is known as "taking cold."

A **Croupous** (or plastic) inflammation is one characterized by the formation of a **firm fibrinous false membrane**. It may occur on a **serous surface**, as the pleura, peritoneum, or synovial membrane of a joint, in the form of plastic lymph, which may form into adhesions; it is also seen in **open wounds allowed to granulate**, and it occurs in the lungs in **lobar pneumonia**.

A **Diphtheritic** inflammation is one due to a special organism—the **Bacillus diphtheriæ**—and is evidenced by the formation of a membranous exudation with which are incorporated the superficial layers of the epithelium, so that it **cannot be removed without leaving a raw surface**. The bacilli develop in this false membrane and produce toxins, which by their absorption into the blood give rise to the constitutional symptoms of the disease.

The term **Phlegmonous** is now but rarely employed. It was formerly used to indicate an **inflammatory condition when all the local phenomena were well marked**.

Treatment of Acute Inflammation.

It is only possible here to deal with the **general principles** which guide us in the treatment of inflammatory affections.

The **Local Treatment** may be indicated under four headings:

1. **Remove the exciting cause**, if evident, and any contributory causes where possible.

2. **Keep the inflamed part at rest.** Wherever inflammation exists, both physical and physiological rest must be secured as far as is possible.

3. **Reduce the local blood-pressure and hyperæmia**, and thus diminish both the exudation and pain. **Elevation** of an inflamed limb may secure this end. **Local blood-letting** by leeches, punctures, scarification, and **wet or dry cupping**, may be recommended in suitable cases, and may give immense relief.

Cold wisely utilized may be of the greatest service in combating inflammation by causing contraction of the arterioles, and so reducing the hyperæmia. It should be used **only in the early stages**, and **never when suppuration is threatening**, as, although it may cause local depletion of the blood-vessels, it at the same time **depresses the vitality of the part**, and so may do more harm than good. Again, it should be used **with the greatest care in old people**, from fear of causing **sloughing of the skin**. There are various methods of applying it, as by means of an **ice-bag**; or a piece of **lint wrung out of evaporating lotion** may be placed directly on the part, and constantly renewed. Under any circumstances the **cold must be continuous, and not intermittent**, as otherwise the alternating periods of anemia and hyperæmia will have a baneful rather than a beneficial influence.

Heat, especially when combined with moisture, is very largely used in treating inflammatory affections, and acts in a diametrically opposite way to cold by **relaxing the vessels and tissues**, thus **reducing the tension and pain**; it also favors the activity and vitality of the part by **increasing the vascular supply**. When suppuration is threatening, the application of warmth and moisture **hastens the process**. For **subcutaneous injuries**, **hot fomentations**, medicated or not with **opium or belladonna**, or simply **dry heated cotton-wool**, may be employed. When an abscess is forming, nothing can be more soothing and satisfactory than a **linseed-meal poultice**, provided that the abscess is not allowed to burst into it. They should never be applied to **open wounds or abscesses unless the latter are in a very unhealthy state**, and then the poultice should be rendered more or less antiseptic by making it with **hot carbolic lotion (1 in 30)**. The **boracic poultice**

or fomentation is most useful in many **superficial** inflammatory affections due to **sepsis**, **dirt**, and **want of attention**. It consists in the application to the part of a portion of boracic lint wrung out of a hot boric acid solution (1 in 20), and covered with oiled silk.

4. Prevent the access of fresh sources of irritation or infection, such as those due to putrefactive changes in an open discharging wound.

The **General Treatment** of inflammation varies considerably with the condition of the patient, and as to whether he is strong and healthy, or weakly. Those who are **depressed in health**, or who may be expected readily to become so, will need to be carefully supported by a **tonic plan** of treatment, whilst at the same time attention must be directed to the **elimination** of toxic bodies by suitable **purgatives**, **diaphoretics**, and **diuretics**.

Chronic Inflammation.

The **phenomena** of chronic inflammation are much the same as those of the acute process, but the **manifestations** are somewhat different. The main differences in the two processes are as follows:

1. The hyperæmia is less in amount, but longer in duration, owing to the fact that the agent is similarly less intense in action, although spread over a longer interval. The local manifestation will therefore be less obvious; there is not so much pain, which is mainly of an aching character, and less heat, whilst the redness is more dusky, and the tissues tend to become pigmented. Considerable loss of tone in the vessels, especially the veins, results from the prolonged distension, and thus there is much greater difficulty in restoring them to a normal state.

2. The corpuscles do not escape from the vessels in as large numbers. The exudation is much more fluid in character, containing comparatively little albumin or fibrin.

3. The greatest difference in the acute and chronic processes lies in the reaction of the tissues, which in the former are in a much more depressed or passive condition than in the latter. They become infiltrated with round cells, derived more from the connective-tissue elements, and hence organization (i. e., the increased formation of new tissue or scar-tissue) is much more marked here than in the acute form. Tissue destruction, then, is a much less prominent feature of the early stage of chronic inflammations, although as a secondary change, especially in tubercular and syphilitic diseases, it is often seen.

The **Causes** are similar in character to those producing the acute mischief, but slighter and more prolonged in their action, and thus tend to produce tissue proliferation rather than tissue destruction. Most of the manifestations met with are due to syphilis, tubercle, gout or rheumatism, and one should never treat such a case without carefully inquiring as to the possible existence of some such taint.

The **Results** of chronic inflammation vary considerably according to the part of the body affected, and also with the predisposing state, and we can at this place only epitomize a few chief points worthy of being noticed.

In **Simple** chronic inflammation the part becomes infiltrated and enlarged, mainly from proliferation of the connective tissues. Thus, a bone is thickened and condensed. Glands become larger and indurated, whilst if the skin is involved it may either become increased and thickened in bulk or it may entirely lose its characteristic structure. True suppuration occurs but rarely, although certain organisms may occasionally lead to its development.

In chronic **Tubercular** inflammation (in tuberculosis) the tissue of the part is replaced by pulpy tissue, scattered through which here and there are definite tubercles, or denser spots, which may run together and lead to the formation of caseating foci, i. e., centers about which the tissues become soft and **cheese-like**—termed “caseation”; these in turn may either result in suppuration or ulceration, or may have lime-salts deposited in them—so-called calcification, and their extension be limited by a hardening process around them. In this latter the tuberculosis may be arrested and remain cured so long as the general health is maintained.

In chronic **Syphilitic** inflammation the most marked feature is an invasion of any of the connective tissues by an exudation of cells and hyperplasia, or increase in the size of the cells, which may be diffuse or localized; if the former, general sclerosis of the part results; in the latter, a gumma is developed, which usually undergoes central degeneration and bursts, giving exit to a gummy fluid, and leaving a leathery-looking slough behind.

In all these varieties of chronic inflammation a marked growth of the innermost part of the walls of the arteries of the inflamed area occurs.

Constitutional symptoms are but little evident, beyond those dependent on the condition to which the local phenomena are due, or to septic changes developed secondarily, i. e., as a result of the inflamed condition.

The **Treatment** of chronic inflammation is usually much more prolonged and difficult than that of acute cases, because of the bad constitutional condition which exists so frequently behind it.

1. **The cause must be removed** whenever possible. Dead or diseased bone must be taken away by operation, if feasible, and tubercular material must be got rid of by the knife. A chronic abscess is liable to increase the action of the original irritant through the tension it causes, and hence it should be dealt with as early as possible under the strictest antiseptic precautions.

2. **Keep the part at rest.** This is just as much an essential as in the treatment of acute inflammation. Joints, if chronically inflamed, must be kept still by splints and bandages; the spine, when the seat of chronic inflammation, must have the weight taken from it by suitable appliances, or, better still, by keeping the patient lying down. Sense organs, such as the eye, must be protected from irritation.

3. **Counter-irritation** is one of the most useful forms of treatment for chronic inflammatory conditions. It is applied in many different ways, according to the character of the disease and the part involved. Thus, friction with the naked hand, or with stimulating liniments, produces a hyperemic condition of the skin, and promotes local activity in the superficial parts which may react beneficially on deeper structures. Iodine paint is another useful application, whilst blistering is most valuable in suitable cases. The actual cautery, i. e., searing the skin with a hot iron, is the most severe form of counter-irritant, and is especially useful in some varieties of chronic inflammation of bones and joints.

4. **Pressure** is a most important element in the treatment of chronic inflammatory disorders, and probably acts by artificially bracing up the vessels of the part which have become relaxed and weak from the prolonged distension to which they have been subjected. It may also act by aiding the absorption of the inflammatory exudation. Firm bandaging, and especially the use of an elastic support in suitable cases, is the most satisfactory method of application.

General or constitutional treatment must be also adopted to meet those conditions which are so commonly associated with chronic inflammation, e. g., mercury or iodide of potash must be given in syphilis.

INSTRUCTION TWO—*Suppuration*

Subject Reference

For Abscess of
Tooth, see page
124; Brain, see
page 153; Spine,
see page 187; Rec-
tum, see page 211;
Breast, see page
313.

Bacterial Infection

The Production or Formation of Pus Caused by Microbes.

Acute Abscess—Chronic Abscess.

When the inflammatory process causes liquefaction of the inflamed tissue and of the exudation, the liquefied material is known as pus, and the process which leads to its formation as suppuration. The micro-organisms which cause pus-formation are termed **pyogenic** (literally, "pus-producing"). Any localized collection of pus is known as an **abscess**. Two varieties are described—the **acute** and the **chronic**.

Acute Abscess.

A large amount of experimental work on the relations of bacteria to acute suppuration gives the following conclusions:

(a) **Bacteria are present in all acute abscesses, either in the pus, or in the abscess wall, or in both.**

(b) **Such bacteria can reach the inflamed area either from without the body or from within.** The suppuration occurring in wounds is most commonly due to infection from without. There can be no doubt, however, that **auto-infection** occurs, by which an abscess can be produced by infection from within the body, and **this can happen only when the vitality of the patient is considerably depressed**, and some local condition exists favorable to bacterial development. Thus, in a blood-clot, in an unhealthy individual, whose germicidal power is low, suppuration is likely to ensue from auto-infection, the organisms being previously present in the blood, e. g., the suppuration which occasionally follows a simple fracture.

Occasionally the microbes may be carried either by themselves or in the substance of a small portion of blood-clot (termed an embolus), from one part of the body where an infected wound or injury exists to some other part and produce an abscess there. Abscesses in blood-poisoning are of this type, and similar results may occur after gonorrhea, and after typhoid and other fevers.

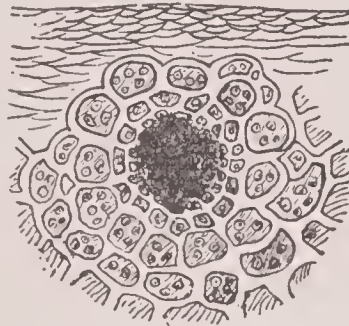
(c) **Ordinary irritating chemical products or sterilized foreign bodies do not produce suppuration, except in the rarest of cases, by auto-infection.** Thus, a ragged splinter of glass, an inch and a quarter long, and an inch and a half wide, the result of the bursting

of a soda-water bottle, was cut out of the neck of a hotel porter ten months after it had entered; it had caused no suppuration.

To sum up, therefore, although suppuration may be experimentally induced in animals under special circumstances, apart from micro-organisms, **in man for all ordinary conditions suppuration does not occur apart from the presence and vital activity of special bacteria.** The causes of an acute abscess may for practical purposes be grouped under the three following headings: (1) The individual affected is very possibly in a depressed and unhealthy state, and the germicidal properties of his tissues are defective. (2) A local area must exist, which is in a condition of depressed vitality, from injury, cold or otherwise; and (3) this spot must become infected with pyogenic organisms brought to it either from within or without the body.

Fig. 247.

Diagram of an *abscess* just forming. The layers of cells above represent the scarf (or surface part of the) skin; the islands represent the cells of the tissue, and the channels are the blood vessels. In the center the vessels are plugged up by clotted blood and the tissue is dead. About the outer part the vessels are widened, hence the redness of the place where the abscess or "gathering" is forming.



The **Signs** and **Symptoms** of an acute abscess may be arranged under three headings:

1. The **local signs** consist of a localized patch of inflamed tissue, evidenced by heat, pain, redness and swelling, which latter is at first hard and brawny, but when pus forms the center becomes soft, elastic, and fluctuating, whilst superficial swelling is more marked, and the pain more throbbing in character. Naturally, the amount of this pain depends entirely upon the density of the tissue affected, and the supply of sensory nerves to the part. Suppuration beneath a dense resisting membrane, such as the fascia in the palm of the hand, being always intensely painful. If left to itself, an abscess sooner or later "points" and bursts. As it increases in size, it exerts pressure in all directions, and naturally seeks to find an exit from its environment in the direction of least resistance, and so may either find its way to the surface, or may burrow along muscular and fibrous planes, or into adjacent cavities. When the pus reaches the surface, it usually opens by a simple process of ulceration.

2. **Pressure effects** are mainly due to the mechanical influence of the swelling upon surrounding structures. The most evident are

those due to the irritation of nerves, as a result of which neuralgic pain may be present, or the patient may refer the pain to some distant unaffected region.

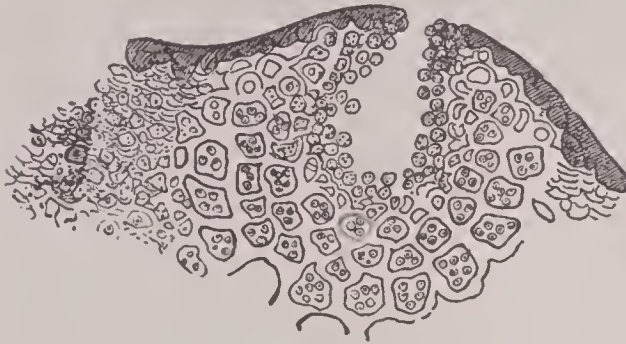


Fig. 248.

Diagram of an abscess after it has burst or opened. The cavity is lined by pus lying on granulation tissue (with newly formed blood vessels) and the surrounding parts have dilated vessels and are infiltrated or thickened by the invasion of them by white blood cells.

3. The **general effects** of the formation of an acute abscess are simply those of increased fever, sometimes amounting to a rigor. A **rigor** consists of a definite series of phenomena, the result of some stimulating influence reaching the centers of the groin which control heat-production of the medulla, determining a sudden increase of activity. It is very similar in nature to an attack of ague, being ushered in by a feeling of intense cold and discomfort; the features are pinched, and the teeth chatter. The skin, however, feels pungently hot, and the temperature of the body rapidly rises. The sensation of cold is partly due to the contact of air with the dry, hot, unperspiring skin, and also possibly to the condition of superficial bloodlessness which is present. After this stage has lasted a variable period, the patient gradually begins to feel warmer, the face becoming flushed, the thermometer ceasing to rise, and the skin beginning to act. Finally there is a rapid fall of temperature accompanied by profuse perspiration, which leaves the patient more or less exhausted.

Treatment of Acute Abscess.—When an inflamed area is threatening to suppurate, the formation of pus can be but rarely prevented. In the early stages, elevation and rest of the part, together with the application of cold and evaporating lotions, may sometimes succeed in accomplishing this. The bowels should be well opened with calomel and Epsom salts.

As a rule, however, one encourages suppuration by applying hot fomentations to the part, and then as soon as pus is evident, an incision is made to evacuate the matter. In incising an abscess, care must be taken that the opening is large enough to prevent re-accumulation, that it is placed at a spot suitable for drainage, as far as possible from sources of septic contamination, and in such a direction that movements of the part do not close it. The anatomy of the

region incised must be remembered, and important structures avoided. In dealing with deep abscesses in dangerous regions, **Hilton's method** may be advantageously employed. It consists in merely dividing the skin and superficial structures, and then thrusting a director into the abscess cavity; a pair of sinus or dressing forceps is now passed along the groove, and on forcibly separating the blades a sufficient opening is made to insert the finger, where practicable, and subsequently a drainage-tube.

It is advisable to gently squeeze an abscess after opening it, especially when sloughs are present, or when it is burrowed. All that is needed subsequently, if there is no complication, such as the presence of dead or diseased bone, is to arrange for drainage by inserting a drainage-tube, and to exclude sepsis by a carefully applied antiseptic dressing. There is often a considerable loss of blood during the first twenty-four hours from the yielding of the capillaries in the abscess wall, owing to the sudden relief of tension; but this usually ceases of itself, or yields to moderate pressure. When once pus has been evacuated, no more is formed if the cavity is kept aseptic, and the wound rapidly closes and heals.

Chronic Abscess (Cold or Congestive Abscess).

A chronic abscess is a collection of pus which forms slowly without any signs of active inflammation. Although a few may be due to infection with pyogenic microbes, the vast majority are tubercular in origin; and, indeed, when a chronic abscess is spoken of, it may be taken for granted that it is tubercular, unless otherwise stated. Wherever tubercle can be deposited, a chronic abscess may form; but it occurs most commonly in connection with bones, joints, and lymphatic glands.

Such an abscess arises from the degeneration of a tubercular center without pain or inflammatory redness; it forms a soft fluctuating swelling, gradually increasing in size, and possibly by its pressure effects becoming painful; it tends to come directly to the surface if there is no dense fascia to prevent it. Being usually placed deeply, there is a great tendency for it to burrow and become superficial at a spot far removed from its original source. Thus an abscess has been known to originate in a vertebra of the neck and on account of its relation to muscles and fibrous layers it has traveled down through the body into the leg and finally came to the surface at the side of the heel. What are known as "psoas abscesses" are tubercular abscesses begin-

ning in the lumbar vertebræ (small of the back) and extending into the groin or even down into the thigh.

Natural Cure.—A tubercular abscess does not necessarily point or discharge itself. Occasionally the fluid portion is absorbed, the solid elements left behind are encapsuled, and perhaps infiltrated with lime salts. The abscess may then remain quiet for years, or it may light up again if the person's health be lowered.

Results of Chronic Abscess.—When a chronic abscess is opened antiseptically (i. e., so as to avoid the introduction of disease germs), and maintained in an aseptic (i. e., clean) condition, suppuration is, as a rule, of short duration; the wound may remain open for months, but the discharge will be merely watery, and no constitutional results will be manifested. The temperature remains normal, and the general health is unimpaired, if no other disease is present. But let such an abscess become septic, and the condition of affairs is at once changed; the discharge becomes purulent,¹ fever supervenes, and grave visceral changes occur, which sooner or later may lead to the patient's death from exhaustion. Long-continued suppuration, then, is always an evidence of sepsis, and from it two conditions may arise, viz., **hectic fever** and **lardaceous disease**.

Hectic Fever is a **chronic condition of blood-poisoning**, due to the continual absorption of small doses of the poisons produced by bacteria in septic wounds. It may be met with not only after opening chronic abscesses, but also in septic syphilitic or cancerous disease. It is characterized by a regular daily elevation of temperature, which runs a tolerably typical course. It commences to rise during the afternoon, the patient's face becoming flushed (hectic flush of the cheeks), the eyes bright and sparkling, the pupils dilated, and the patient feeling better and stronger. The pulse, however, is small, compressible, and ten or twenty beats quicker than it should be; the tongue becomes red at the edges and tip. This condition continues till late in the night, by which time the temperature may have risen four or five degrees. It then commences to fall as rapidly as it had formerly risen, and usually drops to the normal, or even below it, and in the early morning a profuse perspiration breaks out which soaks the patient's clothes, and leaves him in a much-exhausted condition. This is known as a "night sweat," and is a distressing symptom in the third stage of consumption or phthisis. Day by day this continues, the fever and sweating together causing a marked diminution in the patient's strength.

¹**Purulent** means "containing pus"

Amyloid or Lardaceous Disease of various organs is also present in cases of long-standing suppuration. As to the cause of this curious condition, but little is known; either from the injurious effects of septic compounds circulating in the blood, or from the loss of some special substance in the discharge of pus, the **walls of the smaller arteries** and the **protoplasm of certain of the viscera** is converted into a waxy substance (from which lardacein, an extremely insoluble proteid body, may be obtained). The organs mainly affected are the liver, spleen, kidneys, and intestines. Owing to the changes in these organs there are both increased loss of food substances and diminished absorption of food, and the strength of the patient is steadily undermined. If the patient can stand an operation, one should be undertaken at once. The organs return to normal when the chronic abscess is removed by the operation.

Treatment of Chronic Abscess.—There is no reason here to depart from the ordinary rule of surgery, that pus should be evacuated as soon as possible after its formation. This must be done by a surgeon, under the strictest possible precautions to avoid infecting the seat of the abscess with disease germs.

Sinus and Fistula.

When an abscess has been opened, and does not completely heal, a communication often persists between the original seat of the abscess and the exterior. This passage is known as a sinus or fistula. A **Sinus** is a narrow track lined with granulations,¹ penetrating into the tissues, open at one end and closed at the other. The discharge from it may contain pus or be merely watery, according to whether or not sepsis is present. A **Fistula** is an **abnormal communication between two cavities, or between a cavity and the external surface**. It usually arises from an abscess which points into both cavities (or into the one cavity and on the surface).

It is often a matter of the greatest difficulty to secure the healing of a sinus or fistula, and the following are the main **causes of their non-closure**: (1) The presence of some chronic irritant in the depths of the wound, such as a piece of the clothing, a catgut ligature, a piece of silver-wire used in an operation, or of some diseased tissue, such as a fragment of dead bone; (2) the irritation of discharges finding an exit through the abnormal opening, such as

¹ *Granulations* are new tissue buds which cover a healing surface. These have the appearance of little grains (granules) scattered over the surface.

urine, feces, or fetid pus; (3) insufficient drainage of a deep cavity, so that there is always a certain amount of tension in the wound; (4) want of rest to the part, due either to voluntary movements, as in the limbs, or to involuntary muscular action in the immediate neighborhood, as in fistula in ano (i. e., fistula forming a side passage from the rectum to the outside); (5) tubercular infection of the wall, or a tubercular deposit at the bottom of the sinus; (6) constitutional debility.

Treatment.—The removal of the cause is the first thing to accomplish in dealing with a sinus or fistula. The passage must be dilated or slit up to allow of access to the deeper parts of the wound, to remove any foreign body which may be present, or to allow of the satisfactory drainage of a deep cavity. The making of a second opening to give drainage at a lower point often suffices to cure a sinus. A thorough purification of the part by pure carbolic acid or chloride of zinc must be secured, and the wound dressed by plugging with suitable material and kept at rest, whilst the general health of the patient is improved by tonics. Occasionally, the pressure of a bandage to immobilize the part is all that is required, or the application of a suitable splint. The most complete and certain method is to lay the sinus open, and thoroughly destroy the lining tissue by scraping or cauterizing, then plug the wound, and allow it to heal from the bottom by granulations.

INSTRUCTION THREE—*Ulceration*

Subject Reference: For Description of Ulceration, see page 4; Ulcerated Tooth, page 156; Ulcer on Tongue, page 165; Ulcer of Stomach, page 403.

Chronic and Malignant Ulcers

VARICOSE ULCER.

Ulceration is the disintegration of the superficial tissues, which liquefy and disappear, as a rule, without any obvious slough. It differs from **gangrene** in that the latter term is used to denote the **simultaneous loss of vitality** (or death) of a considerable portion of tissue. The two processes are, however, often so closely associated that it is impossible to draw a hard-and-fast line of distinction between them. In short, both ulceration and gangrene signify tissue necrosis, i. e., tissue death; in the former the dead particles are not always visible to the naked eye, whereas in the latter the dead portions can always be seen.

Causes.—Practically, the process is due to the application of an

irritant to the surface of such an intensity, and for such a period, as to lead to local inflammation resulting in the destruction of the tissue affected. Any form of irritant, whether chemical, thermal, physical, or infective, may accomplish this end, and all the factors predisposing to inflammation will hasten its occurrence. Thus, faulty nutrition, whether from anemia or from long-standing congestion, is particularly likely to further ulceration.

Treatment.—This resolves itself into removing the cause, protecting the surface from all sources of mechanical irritation, and purifying it from all septic contamination. The inflamed part must be kept at rest, and if necessary raised from a dependent position (i. e., the leg must not be allowed to hang down), whilst the sore is dressed with moist and warm antiseptic applications, such as a boracic poultice. When the parts are very offensive, a charcoal and linseed-meal poultice may be first employed. The state of the bowels and constitution must be attended to, and probably a mild purgative will be needed. Under such a regime healthy repair is as a rule soon established.

All the forms of chronic ulcer which are neither spreading nor actively healing may be included in this transitional stage, viz., the indolent or callous ulcer, the irritable, the varicose, etc. They are most commonly seen on the legs of individuals whose occupation involves much standing; varicose veins commonly coexist, and the irritation of the skin by dirt and perspiration rubbed in from soiled clothes and filthy linen rags increases the mischief.

The **Indolent** or **Callous Ulcer** occurs most frequently on the lower legs of women about the middle period of life. The size varies immensely, but sometimes they are so extensive as to involve the whole circumference of the limb. They are also caused by burns on any part of the body where a large wound has been present. Healing proceeds to a certain extent, and then stops from the fact that the contraction of the scar tissue already formed interferes with the vitality of the part still unhealed by compressing the vessels, and so cutting off the nutriment.

The **Varicose Ulcer** occurs in the leg of a patient who is suffering from aggravated varicose veins. The skin becomes congested, and its nutrition is consequently impaired; any injury or abrasion, which would readily heal in a sound limb, is likely under such circumstances to give rise to a chronic sore. Again, it may be preceded by eczema resulting from the irritation of dirt or the friction of hard trousers, whilst occasionally it may result from the yielding of the

thinned skin which forms the only covering of a much-dilated vein, an accident leading to severe hemorrhage. The characters of a varicose ulcer vary considerably.

The **Chronic Ulcer** needs much care in its treatment, and some cases require operative interference. Rest in a more or less elevated position is absolutely essential in order to relieve the congested condition of the limb; whilst if the surface is foul, a charcoal poultice may be beneficial, or it may be dusted over with iodoform, and boracic poultices applied. This may be preceded in some cases by touching the surface of the sore with nitrate of silver, or with a solution of chloride of zinc (40 grains to 1 ounce).

Pressure has been found of considerable service in the after-treatment of these ulcers; an ordinary bandage, reaching from the toes to the knee, will suffice in some cases, a suitable dressing of boric acid ointment, with perhaps some resin ointment added to make it more stimulating, being applied beneath it. **Martin's** india-rubber **bandage** is more serviceable when the veins are much enlarged; and where there is not much action, **Baynton's** plan of **treatment**, viz., strapping the limb and ulcer with adhesive plaster, may be advisable. The strapping must be laid on very evenly, and changed every forty-eight hours. If there is much discharge, holes must be cut in the plaster to allow of its exit, whilst antiseptic wool must surround the limb to prevent its becoming foul.

The **Eczematous Ulcer** must be dealt with differently from the others, or the eczema will be aggravated. Soothing applications are needed, such as lead lotion, and when once the acute stage has passed, tarry preparations, or a solution of ichthyol (1 in 4 of water), may be beneficially employed. A mixture of benzoate of zinc and boric acid ointment is a very useful application.

The **Treatment** of a healing ulcer is simple in the extreme. All that is needed is to keep the surface free from irritation, and Nature will rapidly bring about a cure. The limb, if such it be, must be kept at rest, and if the leg is the seat of the trouble, it must not be allowed to hang down. The wound is dressed with any simple unirritating antiseptic, and perhaps boric acid is as good as any; a piece of protective, the exact size of the sore, may with advantage be placed over the wound, or ointment spread on lint or gauze applied. If the granulations become too prominent (a condition known as "proud flesh"), they may be lightly touched with nitrate of silver, and a more stimulating lotion applied.

Skin-grafting, or the transplantation of more or less of the thick-

ness of the skin from a healthy to a healing part, was introduced by Reverdin in 1869, and has since been much elaborated. The following methods are employed:

1. Transplantation of small portions of the cuticle and cutis.
2. Transplantation of large portions of cuticle. This method consists in removing large strips of cuticle and cutis vera with a razor, and implanting them on the surface of the wound previously denuded of all granulations.
3. The whole thickness of the skin may be used in some instances.
4. The skin of animals, such as frogs and young rats, has been employed with success in some cases; but it is just as easy, and much more satisfactory, to make use of human skin for this purpose.
5. Another plan that has been suggested consists in "sowing" the surface of the granulations with the debris removed by vigorous scraping of a healthy portion of the skin.

Malignant Ulcers.

These are due, as has already been pointed out, not to any inflammatory process, but to the actual replacement of the skin by the growth, so that loss of substance necessarily ensues. It is only requisite to mention the varieties here:

(a) **Rodent** ulcer, a chronic cancer starting in the sebaceous glands or hair follicles, and accompanied with very little overgrowth.

(b) **Epitheliomatous** ulcer, arising from cancer of the skin or mucous membranes.

(c) **Scirrhus** ulcer, resulting from destruction of the skin over a scirrhus or hard tumor.

(d) **Fungating** ulcer, where a new growth protrudes from the skin.

One or two ulcers remain to be mentioned, the characteristic appearances of which are due, not to any special modification of the ulcerative process, but to some general or local condition which leaves its marks upon the sore.

Perforating Ulcer of the Foot is a term applied to an affection met with (1) in certain central nervous diseases, in which the sensitiveness of the soles of the feet is diminished, so that the patient cannot appreciate any slight injury to them; (2) it arises in a similar way in diseases, such as diabetes, syphilis, alcoholism, etc., and (3)

may also follow injury of the nerves; (4) it is occasionally due to a suppurating wart or corn, or even a chronic epithelioma. The ball of the great toe is the part most frequently affected, but any spot to which undue pressure is directed may become involved, and not infrequently several such sores may be seen on the same foot. A corn or callosity first forms, and under this a bursa, in which supuration takes place, the pus tending to travel not only to the surface, but also deeply, so as to involve bones and joints. A typical perforating ulcer presents the appearance of a sinus passing into the deeper parts of the foot, the orifice of which is surrounded by heaped-up and thickened cuticle. There is usually but little discharge and often no pain. Left to itself, considerable destruction of the bones and joints of the foot may be caused, necessitating amputation; but if taken in hand early, a cure can be established by carefully paring away the thickened mass of cuticle, purifying the sinus, and protecting the parts from pressure, at the same time that measures are directed towards the cure of any nerve lesion present.

Subject Reference

For Gangrene, see page 4; Bed Sores, page 572.

For Prescription for Burns, Scalds and Frost Bile, see pages 630-631.

INSTRUCTION FOUR—*Gangrene*

Gangrene is Death of a Limited Portion of the Body

Bed Sores, Carbuncles, Boils, Frost-Bite, Burns and Scalds.

Gangrene is the simultaneous loss of vitality of a considerable area of tissue. If the process is limited to the soft parts of the body, it is often termed **sloughing** or **sphacelation**, and the dead mass a **slough** or **sphacelus**; if a portion of bone dies, **necrosis** is said to have occurred, and the necrosed mass is called a **sequestrum**; while the term **gangrene** is more especially applied to a death process affecting simultaneously the hard and soft tissues of a limb.

Signs.—Death of a limited portion of the body can be recognized prior to evident post-mortem changes within it by five characteristic signs:

1. **Loss of pulsation** in the vessels.
2. **Loss of temperature**, since no new warm blood is brought to it.
3. **Loss of sensation** in the dead part, although much pain may be experienced while death is occurring, and such may be referred to the dead part through irritation of the nerves above.
4. **Loss of function** of the gangrenous mass, which, if it is a limb, lies flaccid, motionless, and helpless.

5. **Change of color**, the character of which depends on the amount of blood in the part at the time of death; if the limb is full of blood, it becomes purple and mottled; if anæmic, a waxy or cream color results.

These five signs may be in measure present when the vitality of a limb is merely seriously depressed, as by ligature of the main vessel or by its embolic obstruction; but if they continue for any length of time, death is practically certain to ensue, and they will then be rendered more obvious by the phenomena about to be described.

Treatment of Gangrene.

This naturally divides itself into the local and general. **Local** treatment consists in making the part clean in the surgical sense, and keeping it so. As to **General** treatment, but little needs to be said beyond that the strength of the patient must be maintained by plenty of easily assimilable food, sufficient stimulant, and tonics. Pain and sleeplessness must be combated by the administration of a suitable amount of opium or morphia, if the kidneys are healthy. Diabetes and albuminuria need dietetic and therapeutic measures in order to limit, if possible, the excretion of sugar and albumin.

Senile Gangrene is a condition which, as the name implies, occurs almost entirely in elderly people, and is the result of imperfect nutrition of the tissues. The toes are most frequently affected, but it is also seen in the hand, and may attack the nose, ears, or even the tongue.

Causes.—These are to be found mainly in the condition of the circulatory organs. (a) **Calcification or rigidity** of the smaller arteries of the limb or part is the most important factor. (b) A **weak heart** is generally present, leading to low pulse tension and increased difficulty in propelling the blood through the narrowed vessels. (c) The **venous return** may also be **interfered with** by the existence of varicose veins, or a distended condition of the lungs; whilst (d) the **condition of the blood** may be **impoverished** by albuminuria. When such predisposing factors are present, anything that results in (e) **thrombosis either in the main trunks or in the peripheral arterioles or capillaries** is likely to cause gangrene. Exposure to cold may also act as an exciting agent. In either case the clotting extends for some distance, and the height to which the gangrene spreads will vary accordingly.

Symptoms.—**Evidences of malnutrition** of the limb will probably have been noticed for some time in the form of cramp and pain in the

muscles, which rapidly become fatigued and tired, whilst sensations of pins and needles or numbness are also complained of. The circulation may be so slight as to be scarcely perceptible, and the whole limb feels cold and heavy. The skin is frequently more or less congested, and extremely prone to low forms of ulceration or eczēma. The inner side of the great toe is perhaps the commonest situation for the commencement of the mischief, and thence it spreads from one toe to another, and also along the instep and up the ankle to the leg. Pain is a most marked feature, whilst the extent of the gangrene is dependent partly on the amount of general and local vitality, and partly on the cleanliness or not of the surrounding parts. As the disease spreads, the patient tends to become exhausted by the long-continued pain and want of sleep; and septic fever, bedsores, or some pulmonary complication, may also hasten a fatal termination.

Traumatic Gangrene.

By traumatic gangrene is meant the loss of vitality of some part of the body as the result of an injury, whether applied to the main blood-vessels (indirect traumatic gangrene) or directly to the tissues (direct traumatic gangrene).

(a) **Indirect Traumatic Gangrene** may arise from a considerable variety of lesions, and the resulting course and clinical history is similarly variable.

(i) **Ligature of the main artery** should not produce gangrene in a healthy limb; but where it has fallen into a state of chronic malnutrition and anæmia from preceding arterial disease death of a certain portion may result, the case running a similar course to one of gangrene due to embolus. It is usually of the dry type, one or two toes shrivelling up; but if it reaches the more fleshy portions it may remain moist.

This occurrence is sometimes met with after frost-bites, and also in a loop of bowel, which has been strangulated, after removing the obstruction to the circulation.

A similar train of symptoms may result from rupture of the main artery, and compression of the vein by the extravasated blood, an occurrence perhaps most frequently seen after **fractures** and **dislocations**; it is always of the moist type.

Severe crushes or blows are a common cause of gangrene; thus a limb may become mangled between the wheels of machinery, or by heavy weights falling on it, or by the passage of vehicles over it. Not

only are the parts crushed, severely contused, or even "pulped," but the blood-vessels may be torn, and the resulting escape of blood assists in determining the condition. The gangrene is more likely to occur in patients whose circulation is defective, or whose vitality is diminished. Thus a crush of the foot in an elderly patient is often liable to lead to it, whereas in a young and healthy adult it might be prevented.

Treatment.—If the part is hopelessly damaged there is not the slightest use in retaining it in connection with the body, whilst the patient may run considerable risk from the onset of sepsis, and therefore immediate amputation should be undertaken.

Prolonged pressure is also easily capable of producing gangrene, such as that which arises from injudicious splint pressure or in the form of bedsores.

Bedsores are met with in patients who are kept for any length of time in the recumbent posture, or in any one particular position. The parts most exposed to pressure first become red and congested, and finally ulceration or actual gangrene sets in. As a general rule, bedsores are not very extensive or deep, but occasionally when the patient is debilitated, and especially if a condition of lowered sensation is present due to impairment of the nerve-supply, the process may extend widely and deeply. To prevent the occurrence of such sores the most scrupulous attention should be given to the parts exposed to pressure. The nurse must see that the draw-sheet or bed-linen is placed smoothly and without creases, and that no contamination by urine or feces is allowed; if the patient is perspiring freely the sheet should be frequently changed, so as to prevent decomposition of the sweat. The skin of the back should be daily examined, washed with some unirritating soap, and rubbed with a soothing, strengthening and hardening application, such as spirit of wine, methylated spirit, or perhaps, better still, a mixture of brandy and white of egg. It is then dusted over with a mild antiseptic powder, such as boracic acid. If the skin becomes red it should be painted with collodion, and protected from pressure by means of a circular hollow water-pillow. When an open sore forms it must be kept aseptic, and dressed either with boric acid ointment, or, in the more sluggish cases, with resin and boric acid ointments mixed. Friar's balsam is also useful in this condition.

The action of **corrosive or caustic chemicals** is often followed by a localized traumatic gangrene, the degree of which will vary with the amount and character of the irritant present, and the duration of its

action. All that is needed, as a rule, is to keep the parts aseptic, and allow them to be absorbed or separated by natural processes.

Carbuncle and Boil.—A **Carbuncle** is a gangrene of the subcutaneous tissues, due to a local invasion. It occurs in individuals run down by any general debilitating condition, such as albuminuria or diabetes, and in whom the germicidal powers of the tissues are much depreciated; it is also met with occasionally after acute fevers. The exciting cause may be some blow or squeeze, resulting in extravasation of blood, or some local diminution of vitality; into this area germs are implanted either by auto-infection, or more usually through the sweat-glands or hair follicles, or through some slight superficial break in the skin.

Signs.—A carbuncle commences as a hard, painful infiltration of the subcutaneous tissues, the skin over which becomes red and dusky. The swelling gradually increases in size in all directions, until even a diameter of six or more inches is reached. As it extends the central parts, which were formerly brawny, become soft and boggy, and the overlying skin shows evidences of yielding to the pressure within. Vesicles form on the surface, and finally pustules; these in turn burst and allow a tardy exit to the ashy-gray sloughs and purulent discharge accumulated below. Fresh openings gradually form, leading to a sieve-like condition of the skin, due probably to the passage of the pus along the lines of least resistance, viz., the perforations of the cutis at the sites of the sebaceous glands and hair follicles. As the violence of the inflammation subsides the sloughs gradually separate, leaving a clean granulating wound. Carbuncles most frequently occur on the back, the nape of the neck, the shoulders, and nates, or buttocks, where the vitality of the tissues is never very active; when they form on more vascular parts, such as the face and lips, the consequences may be even more serious, owing to the onset of an infective plugging of the large veins which are here present. They are usually single, and may be accompanied by a painful enlargement of the nearest lymphatic glands.

There is usually considerable constitutional disturbance of a weakening type, although the temperature is not necessarily much raised. Sometimes the gravest symptoms of blood-poisoning may supervene.

A boil is a gangrene of a small portion of the skin. A carbuncle affects the subcutaneous tissues primarily, and the skin only secondarily. Boils are multiple, conical in shape, more localized, and when suppuration has occurred the process is terminated by the discharge of the pus and slough through a single opening. Carbuncles, on the

other hand, are usually single, much larger, flatter, and the sloughing process may continue peripherally, whilst the central part is discharging its sloughs through several openings.

The **Prognosis** of carbuncle mainly depends upon the condition of the internal organs. If the patient is a confirmed sufferer from diabetes or albuminuria there is always considerable risk of his sinking from exhaustion. The vascularity of the parts also influences the result, although there is more power of repair about a vascular region like the face.

Treatment must always be of a tonic, supporting character. Good food, iron, quinine and alcohol, according to judgment, must be administered, whilst appropriate medicine (e. g., codeia or opium) and limitations of diet are necessary in diabetic patients. Locally, many different forms of treatment have been suggested. The most thorough and satisfactory is to lay the carbuncle freely open under an anesthetic and scrape with a sharp spoon or cut away all sloughs until healthy tissue is reached, and then to thoroughly disinfect the cavity with pure carbolic acid. The hollow thus formed is stuffed with antiseptic dressings, such as gauze soaked in an iodoform emulsion (10 per cent), and the case will then rapidly get well. Another less radical proceeding, especially suited to old people, is to make a free X-shaped incision, and allow the sloughs to separate, assisting matters by antiseptic poultices. The old plan of destroying the cutis with potassa fusa is extremely painful, and has nothing to recommend it.

A **Boil** or **Furuncle** is a still more limited form of gangrene than a carbuncle, in that only a small portion of skin and subcutaneous tissue, usually round a hair follicle, is destroyed. Experimentally, a plentiful crop of boils can be produced by rubbing a culture of staphylococcus into the skin, and it is supposed that a similar infection through the hair follicles is the most common cause of this condition. The secondary boils around a primary one are without doubt due to the friction of the dressings covered with pus and microbes upon the healthy integument.

People with a coarse skin and a tendency to comedones, or obstruction of the sebaceous follicles, are especially liable to the occurrence of boils. A gangrenous inflammation ensues after infection, resulting in the death of the hair follicle, or of the sweat or sebaceous gland involved, and of the surrounding connective tissue, and the slough thus formed is cast off by a process of suppuration. A matured or ripe boil, therefore, consists of a central slough or core, a zone of pus around it, and external to this granulation tissue merging

into healthy skin and connective tissue. Although infection from without is the local exciting cause, there is frequently present some depression of the vital powers; such may lead to crops of boils recurring again and again.

Signs.—A boil commences as a small red irritable pimple, from which a hair may often be seen to protrude, which increases gradually in size, becoming more and more painful, until it forms a conical tumor, deep red in color and exquisitely tender. A small whitish spot appears in the center, and around this so-called core yellow pus can be seen. Finally it bursts, discharging the pus, and subsequently the core or slough comes away. The process is then at an end, and the wound rapidly heals by granulation. Occasionally the inflammation extends a little more deeply into the subcutaneous tissues, constituting a "carbuncular boil." The neighboring lymphatic glands become sympathetically enlarged and painful, but rarely suppurate. A succession of boils may appear one after another in the same individual for weeks or months. Occasionally they subside without suppuration, leaving the parts thickened and infiltrated, a condition known as a "blind boil."

Treatment.—Locally, many boils may be left to burst naturally though possibly the process may be checked by surrounding them with a piece of ordinary adhesive plaster, with a hole over the apex of the swelling. The top of the boil, or the point of the swelling, should be touched twice a day with a small drop of carbolic acid, on a toothpick or pointed match. This will soon cause the boil to open and the carbolic acid will then keep it clean and promote healing. As a rule, however, it is but to hasten matters by applying poultices and incising when mature. Tonics are usually advisable, except in full-blooded individuals, for whom a spare diet and abstinence from stimulants is necessary. A change of air to a bracing seaside place is often advisable, especially when the condition persists, crops of boils appearing from time to time. Sulphide of calcium (1-6 to 1-4 grain) combined in pills with quinine and iron may also be administered.

Gangrene from Heat or Cold.

Frost-bite.—This condition is by no means uncommon in regions where the winter is more severe. It occurs in those who are exposed to the cold, and is induced more readily if a high wind is blowing, the heat of the body being thereby more quickly dispersed. It may originate in one of two ways:

(a) **From the direct effect of cold on the tissues, which become**

shrunk, hard, and of a dull, waxy appearance. No pain is, as a rule, experienced in the freezing process, so that onlookers are more likely to recognize the condition than the individual himself. The extremities of the body, where the circulation is a little sluggish, and exposed parts, are chiefly liable to be attacked, and thus the nose, ears, fingers and toes are most often involved. It is also more likely to occur in the young and in old people whose vital powers are not very great. The result is that gradually the part shrivels up, turns black, and is either absorbed or separated by a process of ulceration with or without suppuration. The most marked feature of gangrene from frost-bite is the more extensive implication of the superficial parts on account of their greater exposure.

(b) **From the subsequent inflammation** that arises in parts which, though frozen, are not immediately killed. The thawing of such structures is accompanied with the severest pain, and the prolonged anæmia causes such a lowering of the vitality of the vessel walls that the re-admission of the circulation is only too likely to be followed by an acute inflammation, which terminates in necrosis from strangulation of the vessels. If it escapes actual death the part remains red, congested and painful for some time, and superficial ulcers may even form; eventually, however, it recovers.

Treatment.—The frozen parts must be thawed very gradually, and the blood admitted into the tissues very slowly if inflammatory gangrene is to be avoided. They should be gently rubbed with snow or cold water, and gradually warmed by being held in the hands of the manipulator or covered with fur, and the patient should be placed in a cool room, the temperature of which is raised but slowly. As reaction comes on, a small amount of warm drink may be cautiously given. Excessive pain and swelling may be limited by elevation of the part. If actual gangrene occurs, the dead tissue must be rendered and kept aseptic, and the case carefully watched until a definite line of separation has formed.

Burns and Scalds.—These may be considered as a special variety of wound, not necessarily ending in gangrene, brought about by the action of heat; burns, either by the close proximity to or direct contact with, flame or heated solid bodies; scalds, by the action of boiling water, superheated steam, or other hot fluids or gases, the difference in the effects being comparable to the distinction between roasting and boiling. Naturally fluids, such as oil, which boil at a higher temperature than water, produce increasingly severe results. Their treatment is given elsewhere.

INSTRUCTION FIVE—Sepsis and Infection

Septic Poisoning

Infection Due to Bacteria or Parasites of Micro-Organisms
which Develop in Living Tissues

Felon, Erysipelas, Lock-Jaw, Hydrophobia, Tuberculosis, Leprosy

A **Septic Process** is one due to the activity of organisms which have only the power of developing in dead tissues or fluids, or in passive material such as blood-clot, pus, or serum. They may occasionally gain an entrance into the general circulation, but are quickly disposed of and do no harm. They are termed non-pathogenic or saprophytic microbes, and the processes resulting from their activity are akin either to putrefaction or fermentation. The action of these organisms is to reduce the more complex chemical substances to simple compounds, thus bringing about their disintegration. At the same time irritating or poisonous chemical products are formed, known as ptomaines, which cause the symptoms of septic poisoning, whether local or general.

Local Septic Processes are those produced in a wound or its immediate neighborhood, or in a cavity, by putrefactive changes arising in some substance within it. The ptomaines thus formed give rise to local inflammation, perhaps running on to suppuration, whilst their absorption along the lymphatics may cause a wide extension of the mischief. Amongst such conditions the following may be noted:

Wound Inflammation, arising either from septic contamination due to a dirty state of the skin, instruments or hands of the surgeon, or from a faulty dressing. In such cases the infective pyogenic organisms are usually present, as well as those which give rise to sepsis. It must be clearly understood that the term "sepsis" is often made use of, without any strict pathological significance, to indicate that the process of healing is not following a normal course, owing to the presence of micro-organisms. Many so-called septic wounds are in reality infected with some one **pathogenic organism**, whilst in almost every instance ordinary **pyogenic** (i. e., infective) organisms are present, as well as those characteristic of sepsis. A dry wound is much less likely to become septic than one in which there is much exudation of blood or serum, so that **absolute hæmostasis** (arrest of bleeding) and **good drainage** are two most important preventive measures. When sepsis occurs the lips of the wound become puffy, red and swollen, and if there is much tension the pain becomes very severe and throbbing. Healing comes to an end, and unless all tension is quickly

relieved not only will there be high fever but the inflammatory mischief may also extend in all directions, leading to diffuse suppuration. All stitches should be immediately removed, the wound well washed out with some antiseptic, and stuffed with gauze soaked in an emulsion of iodoform and glycerine. Occasionally it may be advisable to temporarily apply an antiseptic fomentation. At the same time the bowels are to be well opened, and the general health of the patient carefully attended to.

Infection.

An infective process is one due to the activity of micro-organisms which can develop in living tissues—the true pathogenic bacteria or parasites. Such find an entrance into the body in many ways, as through the healthy skin, or by the mucous membranes of the alimentary canal, respiratory tract, or genito-urinary apparatus, or through wounds and abrasions; and very often the manifestations of disease differ widely with the channel of entrance. These may also be divided into two main groups: the Local and the General.

Local Infective Processes are those caused at the spot of inoculation by the growth and development of the microbes. After a period of incubation—which varies with different organisms, and during which we may imagine that they are struggling with the germicidal action of the tissues, and establishing their foothold in the body—the organisms begin to grow and multiply, and by the injurious products of their activity cause irritation of the tissues and various forms of inflammation.

These inflammatory foci may remain limited, or may tend to spread with more or less rapidity by continuity of tissue or along lymph channels; or the organisms may be widely disseminated through the body by the blood-vessels in the shape of emboli; that is, little masses which become detached and are carried along in the blood till they lodge in a small blood-vessel. A certain amount of constitutional disturbance may accompany these manifestations due to the absorption of the poisons produced locally, whilst in some diseases the general toxic symptoms (or toxæmia) associated with some slight local mischief may be extremely severe, as in tetanus and diphtheria. Hence local infective processes may be classified in two divisions: (a) those in which there is no general toxæmia, such as a soft chancre, a tubercular abscess, or an ordinary attack of gonorrhœa; and (b) those in which the toxæmic condition is well marked,

as in erysipelas, tetanus, diphtheria, etc., the character of the symptoms varying necessarily with the different toxins.

Many of the organisms which are the causes of local infection may also develop generally in the system, and produce grave constitutional affections.

General Infective Processes are those in which the organisms develop and multiply in the blood-stream, so that inoculation of a sound person with the blood of the patient would almost certainly transmit the disease. Many of the bacteria producing local infection may also give rise to these general diseases, and, indeed, the latter seldom occurs without some local cause being present to explain its origin. Septicæmia, pyæmia, acute tuberculosis, the second stage of syphilis, and probably the exanthemata, or rashes, are illustrations of general infection.

Cellulitis.

Cellulitis (or, as it used to be termed, **diffuse phlegmon**) is a disease which, although exhibiting many diverse manifestations, is characterized by the great general feature, viz., the existence of a **spreading inflammation of the subcutaneous or cellular tissues**, due to the activity of **micro-organisms**, and running on to **suppuration, sloughing, or even general gangrene**.

Treatment.—Cellulitis usually results from the activity of organisms which are readily destroyed, and over which the germicidal properties of the body have considerable control. Hence careful antiseptics can prevent its occurrence to a very large extent. Abrasions and small punctured wounds should always be carefully protected, and all penetrating injuries disinfected, especially if the patient runs any risk of infection owing to his occupation or surroundings. Should inflammation appear, the application of antiseptic fomentations, such as the boracic poultice, may prevent its extension, whilst the bowels should be freely acted upon and the general health attended to. Failing this, and **if there is any** tendency for the inflammation to spread incisions **should be made** into the brawny tissues, so as to give exit to the serous and irritating discharges; the wounds thus made are dusted with iodoform and stuffed with gauze, over which the usual dressings are applied; and it is often wise to use a piece of mackintosh in the outer folds of the dressing, so as to keep the parts moist and encourage a free discharge. Under such a regime sloughing may be entirely prevented, or, at any rate, limited. At the same time the patient's health and strength must be maintained by the administra-

tion of suitable food and stimulants, whilst quinine is very useful internally.

A Felon or Whitlow is due to septic infection. Four kinds of Whitlow occur, differing in their depth. Thus, one is just under the first layer of the skin, the cuticle; another kind is under the deep layer of the skin, the cutis vera or true skin; a third kind is in the sheath of the tendons of the finger; while the fourth and worst kind is under the periosteum or skin of the bone.

(a) The **Subcuticular** felon consists merely in a formation of pus beneath the cuticle, separating it from the cutis vera. It is **very painful**, but **otherwise is of little importance**. A boracic poultice, combined with the removal of the loose cuticle, is all that is needed in its treatment.

(b) The **Subcutaneous** whitlow is a true cellulitis, commencing in the pulp of a finger, but often spreading upwards to involve the palm. It is attended with great heat, pain, redness, and swelling, which latter is at first hard and brawny, but later on becomes more boggy, and is associated with much swelling of the whole finger, and even of the dorsum or back of the hand. It is often difficult, from the tension of the parts, to be certain of the existence of matter. Constitutional symptoms are not, as a rule, very severe, though the intensity of the pain may exhaust the patient. The hand should be **kept raised**, and the finger **poulticed**. A **free incision should be early made**, and this may be accomplished by fixing the patient's hand under one's own left arm, and cutting in the middle line towards the finger-tip. Occasionally the pus forms at one or other side of the finger, and the incisions must then be suitably planned. The wounds should be **dressed antiseptically** after such incisions, and **no longer poulticed**.

(c) The **Thecal** form of whitlow is in the sheath of the tendons on the point of the finger. The signs are much the same as in the former variety, only more severe, because the process is often more extensive. It is important to remember that sheaths communicate with the palm of the hand—always in the case of the thumb, usually in the little finger, but not, as a rule, in the index, middle, and ring fingers. In the latter case, then, suppuration ceases at the level of the knuckles; but occasionally it oversteps this limit, and involves the palm in the same way as in the thumb and little finger. Free and early incision must be made to prevent such extension, and also to limit, as far as possible, the adhesions which the tendons are liable to form, or to prevent them sloughing from the acuteness of the inflammation. In neglected cases the pus may burrow to the back of the fingers, necessitating counter-openings; or the periosteum may be affected, leading to disease or death of the phalanges; the finger joints may also be involved and stiffened. If the palm is involved, care must be taken in incising the abscess not to wound the artery in the palm or its branches to the fingers. The latter arteries are in line with the spaces between the fingers. The artery of the palm is on a line with the lower side of the thumb when it is outstretched. The knife must cut along the centers of the metacarpal bones, and not higher than the middle of the palm; but an incision may also be called for close to the level of the wrist-joint, and this may be made in the middle line without danger.

(d) The **Subperiosteal** whitlow may be merely a complication of the thecal

variety; but occasionally it starts as an acute necrosis of the terminal phalanx, arising either idiopathically or as a result of infection from the nail matrix. The inflammation may be limited to the end of the finger, or may spread to the palm. Free incisions, and the removal of the bone, if dead, must in such cases constitute the treatment required.

Erysipelas.

Erysipelas is a specific infectious disease due to the development of the *Streptococcus erysipelatis* in the smaller lymphatics of the skin and subcutaneous tissues (and occasionally also of the mucous membranes), so that it may be defined as a **spreading, infective and contagious inflammation of the skin or mucous membranes**, the constitutional symptoms being due to the absorption of poisons generated in the affected part of the skin.

The **Causes** of erysipelas may be briefly stated as follows: (i) The existence of an **abrasion or wound** in most cases, and particularly of an **unprotected septic wound**. Thus, it is not uncommon to find it associated with **neglected scalp wounds** or with **those communicating with the mouth**. (ii) A **weak, depressed state** of the constitution, as from alcoholism, vicious living, diabetes, albuminuria, etc. Some people, moreover, seem naturally predisposed to the disease, particularly plethoric and gouty individuals, and one attack always seems to render the individual more liable to recurrences. (iii) **Bad hygienic surroundings** are a most important additional factor in its production, especially overcrowding in hospitals and bad ventilation. But these are all **merely predisposing** conditions; the only exciting and absolute cause is (iv) the infection with the specific micro-organism, which is very widely diffused in Nature. When once an entrance has been effected, the germs develop in the superficial lymph channels, producing a transient inflammatory condition of the skin, and a fevered state from the absorption of specific poisons. The organisms have no great vitality, since it appears that the local reaction which they set up is quite sufficient to destroy them, even whilst they spread peripherally. Immersion for fifteen seconds in a 1 in 30 solution of carbolic acid also ensures their destruction.

The **Symptoms** of the disease are usually ushered in by a **slight chill**, scarcely amounting to a rigor, and by a period of **headache and malaise** for about twenty-four hours, with **some degree of fever**. These symptoms are followed by the development of a **bright, rosy-red rash**, spreading either from the margin of the wound, or showing itself in apparently unbroken skin. If there is a wound, it usually presents a sloughy and unhealthy-looking surface, with very little evi-

dence of repair. If the erysipelas germ is unmixed with other organisms, the healing process may continue until the rash appears, when the young scar will break open again, exposing a dry and sluggish surface, with a thickened margin. The rash is of a **characteristic vivid red color**, always disappearing on pressure, and is accompanied by a **sensation of stiffness or burning**, scarcely amounting to pain, except when **dense structures**, such as the scalp, are involved, and then the pain may be **very severe**. Swelling is not very marked, except in **lax areolar tissues**, such as occur in the **scrotum or eyelids**; it may then attain considerable proportions. The rash continues to advance more or less rapidly, with a **continuous margin**, and as it spreads to new regions it fades away from those already involved, leaving a slight **brownish stain** and a **fine branny desquamation**. **Vesicles** and **blebs** form superficially, containing serum, which speedily becomes **turbid**, but **suppuration** is uncommon, except in lax tissues, such as the eyelids. Occasionally, from the severity of the inflammation or the low state of vitality of the tissues, the **skin may become gangrenous and slough**, especially about the umbilicus and genitals of young children. Neighboring lymphatic **glands are always enlarged and painful**, and this may even be noted at a period when the rash has not appeared. Fever is present as long as the rash persists, and merely shows slight diurnal variations. It is not uncommon for the temperature to rise to 104° F., but anything above that is of grave significance. **At first the fever is of a strong type**, the pulse full, and the **delirium noisy and active**; but later on the pulse becomes quick and weak, accompanied by **low muttering delirium** and **great prostration** of the vital powers. **Delirium** is usually a well-marked feature in erysipelas of the scalp, but this is due to the general rather than to any local condition. The duration of the attack is most variable, lasting, as a rule, from **one to three weeks**, but relapses are not uncommon.

Diagnosis.—There is not much difficulty in recognizing a case of erysipelas if we remember the distinguishing features of the rash, viz., its method of extension by a **broad, sharply-defined, slightly raised and infiltrated red margin**. Thus the **exanthemata** are never limited to one part of the body, and rarely form one continuous red patch. **Lymphangitis** (inflammation of the lymphatic channels) is characterized by streaks or **lines of redness**, not by an area of uniform redness. In **phlebitis** (inflammation of a vein) the skin is seldom red over the inflamed vein, which can be felt as a **hard knotted cord below**. A **septic wound** with pent up discharge closely simulates ery-

sipelas; but the margin of the redness is not so accurately defined, and lymphatic enlargement does not so constantly occur. The so-called erythema solare ("sun-burn") follows exposure to the sun's rays, especially when reflected from water, of parts of the body which are, as a rule, protected; though usually of slight importance, it may sometimes give rise to so much pain, œdema, and constitutional disturbance as to simulate erysipelas. It is readily distinguished by the facts that it is limited to the parts exposed and has no tendency to spread.

Prognosis.—Erysipelas is not peculiarly dangerous in itself, but may become so from the complications which may attend it. The most important of these are **inflammatory conditions of the brain, lungs, and other viscera, disease of the kidneys** being especially serious. **Pyæmia** and **general septic intoxication** may also be met with. Erysipelas of the **face and head** is often attended with **danger to life, particularly in old people**, whose vital powers become rapidly exhausted. The same statement is true as regards **infants**, who have no power of resisting the invasion of the disease. As a local complication, erysipelas is not always an unfavorable occurrence, since wounds which have become chronic and sluggish will sometimes manifest marvelous reparative power after an attack. **Chronic ulcers may rapidly cicatrize, and even malignant sores, especially sarcomata, have been known to be cured.**

The **Treatment** of erysipelas is mainly conducted on general principles. Prevention must be strictly attended to by observing every antiseptic detail in the treatment of wounds, especially when any erysipelas cases are under treatment at the same time. When the disease is prevalent, all operations that can be delayed should be **postponed**. **Isolated cases** should be separated from other patients, and kept **out of surgical wards** if practicable. If, unfortunately, a case develops in the wards, and cannot be completely isolated, the bed should be placed as far away from others as possible, and especially from those with open wounds, which from their position (e. g., the mouth) cannot be properly protected from sepsis. It is usual to surround the bed with sheets kept moist with carbolic lotion, and the floor around should be sprinkled with the same.

As to **Local Treatment**, one can merely protect the part from the air, as by **painting it with collodion**, or covering it with a **thick layer of starch or flour, mixed with boric acid or iodoform**, or in the more severe cases by applying hot fomentations containing opium or belladonna (e. g., 1 ounce laudanum to 1 pint lead lotion.) The

local application of cold is absolutely harmful, as tending still further to depress the vitality of the part. Where tension and pain are severe, abstraction of blood by **scarification** with a lancet may be advantageous. Attempts have also been made to cut short the disease by the use of antiseptics applied to the inflamed region, such as painting the part with a lotion of corrosive sublimate, or rubbing into it mercurial ointment.

Pressure seems to be of some value in limiting the spread of the mischief, acting probably by compressing the lymphatics. A wide band of **adhesive plaster wound around a limb** beyond the margin of the rash is often effectual, and it may be possible in this way to check its onward advance from the scalp to the face or neck.

The introduction of sero-therapeutics has been utilized in this affection with much benefit. An **antistreptococcic serum**, prepared by immunizing a horse with the **Streptococcus pyogenes**, and then withdrawing its blood serum, has been used a good deal, especially in France. Ten or fifteen cubic centimeters of this serum are given subcutaneously as a dose, and repeated once or twice a day. **As a rule, the pain rapidly diminishes, the rash ceases to spread, the temperature falls, and in twenty-four to forty-eight hours the disease is at an end.** Although the serum has not been largely used in this country, there can be but little doubt that in the future we shall depend on this rather than on any of the more old-fashioned plans indicated above.

Constitutional Treatment must be of a tonic and supporting character. Good food, easy of assimilation, stimulants and quinine must be freely administered, whilst the tincture of the perchloride of iron in $\frac{1}{2}$ drachm doses, repeated three or four times a day, is still looked on by many as a sure cure.

Septicemia.

Septicemia is an acute general infective disorder, arising from the development of some variety of pus-forming organism in the blood. It differs from **pyemia** in the absence of secondary abscesses (although it may be associated with it), and from **sapremia** or **septic intoxication** by the fact that the latter is merely a chemical poisoning. In septicemia, if a minute trace of the blood taken at a distance from the local focus of mischief is inoculated into another animal or individual, the disease is almost certainly transmitted, and often with increased virulence; in sapremia, injection of the blood, except in large quantities, does no harm.

Septicemia occurs most commonly from direct inoculation with suitable organisms through small wounds, or from scratches or punctures with infected pins or instruments; it also in rare cases follows operation wounds and severe lacerated injuries. As a rule, the individual attacked is in a depressed and debilitated condition, often deteriorated by alcoholic or other excesses, so that the germicidal power of the tissues is markedly insufficient to cope with the inroads of the disease.

The point of inoculation may be the seat of any of the forms of **local** trouble which we have already described under the title of cellulitis, which may vary from a mere slight inflammatory blush to the acutest form of spreading gangrene.

The **General Symptoms** are those of fever, often ushered in by a distinct and severe rigor; the temperature reaches 104° or 105° F., and usually remains high, with but slight remissions and no intermissions. There is great uneasiness with loss of appetite; the tongue is brown and parched; the pulse is quick and feeble, and the skin, yellow and jaundiced in color, becomes dry and hot, or is sometimes covered with perspiration. Diarrhea often ensues, and may be blood-stained, whilst the urine may be albuminous, and contain blood. Red patches appear under the skin, and the patient, after a period of delirium, falls into a state of coma, and dies. Shortness of breath may precede the fatal issue, whilst the temperature may be exceedingly high, or occasionally subnormal.

Illustrative Cases.—A servant girl, aged about twenty-two, complained one hot summer's day that she had been stung near the inner corner of the eye by a fly. Possibly the animal had come from some infected material, and thus poisoned the wound. In twenty-four hours she was feeling ill and feverish, and had some chills and flushes; there was a painful swelling at the inner canthus, which rapidly increased in size and spread downwards. She rapidly became unconscious and died within a week.

An elderly man, addicted to drink, fell in the street, and grazed the inner side of his hand. Within twenty-four hours the whole arm was puffy and swollen, and in two days gangrene had manifested itself, the infiltration reaching beyond the shoulder. The patient was dead from acute septicæmia in five days.

Prognosis.—Septicemia up to the present has been almost always fatal; but it is to be hoped that the modern plans of treatment mentioned below, especially sero-therapy, may prove beneficial in diminishing the mortality.

The **Treatment** to be adopted was formerly merely general and symptomatic. Dealing with the wound is like shutting the stable door when the steed has flown; the case is usually seen too late to

allow the surgeon successfully to grapple with the disease, since blood infection has probably already occurred. However, as the diagnosis from sapremia cannot always be made with certainty, the **wound should be carefully purified, and free drainage provided. Incisions should be made into all infiltrated tissue**, in the hope of being able to limit the local activity. In addition to such means, which, after all, hold out but little hope, **tonics and stimulants, with plenty of suitable nourishment**, could alone be depended on.

It is possible that even this grave disease may become amenable to some of the therapeutic measures which have been suggested of recent years. Thus, the **antistreptococcic serum** may be utilized, and cases have been already reported as cured by its agency. Another plan which has been adopted is that of the **intravenous injection** of considerable quantities of normal saline solution, repeated two or three times a day; by this means diuresis and diarrhea are induced, and it is hoped that thereby the cocci and their products may be eliminated. This treatment has, however, been introduced so lately that no dogmatic statements can be made about it; it will probably be of **greater value in cases of sapremia** rather than in those of true infective septicemia.

Another recent discovery is the excellent effect of the injection into the veins of a weak solution of formaldehyde.

Pyemia.

Pyemia (Greek *pyon*, pus, and *aima*, blood) is a disease characterized by **fever of an intermittent type**, associated with the formation of **multiple abscesses** (i. e., many abscesses) in different parts of the body, arising from the diffusion of pyogenic materials from some spot of local infection.

The **Cause** of pyemia is any condition which leads to the formation and detachment of infective emboli (that is, pieces of clot which contain disease germs) in the circulation, such conditions occurring mainly in the veins from disintegration of a thrombus (**septic phlebitis**), but occasionally in the heart (**malignant endocarditis**). When an infective embolus becomes lodged in any region of the body, a thrombus, or clot, forms upon it, and in this the micro-organisms rapidly develop, and soon pass into the vessel wall, and thence into the surrounding tissues, causing inflammation, which later on becomes suppurative. These abscesses are small, and rarely give rise to any physical signs. Similar collections of pus may be found in any organ of the body. The lungs, acting as a filter for emboli

derived from the systemic veins, are naturally the first organs to be affected, and from the many abscesses formed therein infection of the arterial system may take place, resulting in fresh suppurative foci in the liver, spleen, kidneys, brain and in or around joints, etc. If the emboli are many in number, the constitutional symptoms will be severe, and **acute pyemia** is present; it is usually associated with a development of micro-organisms in the blood, constituting a condi-



Fig. 249.

A blood-clot in a small vein, which empties into a larger one. The clot projects into the larger vein in which blood is flowing along. Pieces of the clot, becoming detached, may be carried to some other part of the body and the germs in it then set up an abscess; this occurs in *pyemia*, a form of blood poisoning.

tion of pyo-septicemia, and then the patient may die before any secondary abscesses have formed; if the emboli are few in number, and there is little or no development of microbes in the blood, the disease is termed **chronic pyemia**.

Symptoms.—The most marked symptom indicating the onset of a case of **Acute Pyemia** is the occurrence during a period of febrile disturbance of a severe rigor, which is repeated with a sort of irregular periodicity, most frequently at intervals of about twenty-four to forty-eight hours, somewhat simulating an attack of ague. The rigors do not differ from those occurring in other diseases, but they are very severe, and are usually followed by profuse sweating. Between the rigors the temperature may fall to the normal, but more commonly remains above it. The skin is hot and pungent, and soon develops an earthy or dull yellow tint, together with red patches. A sweet, mawkish, hay-like smell of the breath is very characteristic. Symptoms of grave depression soon show themselves, and the patient wastes rapidly. The pulse becomes soft and weak, the excretions are diminished, and a certain amount of nocturnal delirium is noticed, but no loss of consciousness. The tongue varies, but is often red with very prominent papillæ, and tends to become dry and brownish.

In **Chronic Pyemia** the febrile symptoms are much less marked; the abscesses are few in number, and not dangerous unless forming in important structures.

The condition of the wound at the onset of pyemia is always very unsatisfactory. If the result of an operation, it will gape and present an inactive sloughy gray surface, and any newly-formed scar tissue will readily break down. A layer of healthy granulations is an almost certain barrier against the occurrence of pyemia, on account of the germicidal power of the cells constituting it. If the disease arises in connection with bone, the latter structure is usually seen lying bare at the bottom of the wound.

The duration of a case of pyemia is very variable. Acute cases last usually a little over a week, whilst the subacute forms may run on for three or four weeks, and chronic cases continue for months, and may even end in complete recovery.

The Prognosis depends upon the inherent vitality of the patient and the virulence of the disease. In acute cases it is extremely grave, whilst in the chronic type recovery is not only possible but probable, if the local abscesses are favorably located.

In the Treatment of acute pyemia the surgeon is acting at a considerable disadvantage, in that the disease is only recognizable when it has obtained some hold upon the patient. The recurrent rigors, by which it is known, are the evidence of a grave general infection of the blood, for although only a few emboli may have been detached, any one of them is capable of re-establishing the disease, even if the original focus has been satisfactorily dealt with. By strict cleanliness pyemia can, as a rule, be prevented, but if in spite of or apart from this the patient develops symptoms, the surgeon must take the most vigorous measures to check its advances.

Local Treatment is important and consists in a prompt surgical operation.

Constitutional Treatment consists in supporting the patient's strength by nourishing diet and stimulants, and in taking special precautions to avoid bedsores or any local injury. The antistreptococcic serum may also be utilized, and doubtless in certain cases which have not progressed too far it might do good.

Tetanus, or Lockjaw.

Tetanus is a disease due to the presence of a germ (the *Bacillus tetani*) in some part of the body.

Predisposing Causes.—I. Climatic Influences.—It is most commonly seen in the tropics, where it may become almost epidemic, probably owing to the heat favoring the development and virulence

of the organisms in the soil; hot seasons assist its activity, and particularly when hot days are followed by cold nights.

2. **Personal Proclivity.**—It was formerly considered that negroes, horses and stable attendants were specially liable to this disease, but with the recent additions to our knowledge as to the habitat of the *bacillus tetani*, it is extremely doubtful whether such an idea can be maintained. The organism is capable of continuing its development apart from the body—and is **almost constantly found in garden soil and dust or dirt of any kind**. Those, therefore, who are likely to be much brought in contact with the ground—e. g., negroes, horses and agricultural laborers—are most liable to the development of the disease, owing to their more constant exposure to the bacillus.

3. **Bad hygiene** is a most important predisposing condition. Every hygienic error may assist in its development, but especially the overcrowding of sick and wounded people into a limited space, where full antiseptics is impossible. This is the reason why it is so rife in military surgery.

Exciting Causes.—1. The existence of a **wound**. It may follow a lesion which causes no breach of surface, such as a blow with the fist, or a bruise, but in the great majority of cases there is a definite break of the skin. Any region of the body may be thus affected, and there is no preference of one part over another. The old idea that wounds of the web between the thumb and index-finger, or of the ball of the great toe, are certain to be followed by tetanus has no basis in fact, although lacerated septic wounds are extremely common in these regions, and therefore more open to infection. Such wounds are also apt to be deep and to close up quickly, and the lock-jaw germ is also very apt to be present on the hands or feet. It is rare for tetanus to occur in any but septic wounds, and where asepsis has been fully maintained the occurrence of tetanus is almost unknown.

2. The infection with the *Bacillus tetani*. The first clue to the infective nature of this disease was obtained from the observation that, if portions of soil or garden mould were placed under the skin of animals, they died in a short time with tetanic symptoms, and in the pus and walls of the resulting abscess characteristic bacilli were observed. Experimenting in the same way, it has been found that the bacilli or their spores are very widely disseminated, and, indeed, **are present in almost every sample of garden or field-soil**; they have even been found in the grime on a working man's hand, and on dirty surgical instruments. It develops in the body as long delicate threads consisting of and breaking up into separate bacilli, in which spores

form, usually only at one end, causing such an appearance that the microbe is known as the "drumstick" bacillus. They are **anerobic**—i. e., flourish apart from oxygen. They are not endowed with high vitality, and hence will not invade living tissues unless these have been previously bruised or damaged by the presence of septic inflammation. They grow in the neighborhood of and near the surface of septic wounds. The septic organisms absorbing all the oxygen present, and so produce the anerobic conditions necessary for the development of the lockjaw germs. The **mode of action** of the bacillus consists in the production of a local infection with general poisoning of the blood; that is to say, by its local development in a wound certain toxic bodies are produced which, when absorbed, act on the spinal marrow and brain, producing toxic effects very similar to those of strychnine.

Symptoms.—**Acute Tetanus** usually manifests itself two or three days after infection (but sometimes as early as a few hours, or as late as three weeks) by a **difficulty in opening the mouth**, associated with a **cramp-like pain in the muscles of mastication**. This soon becomes so marked that it may be difficult even to insert a paper-knife between the teeth (**trismus**, or lockjaw), and to it is added a fixed and rigid condition of the muscles of the back of the neck and of the face, the latter producing a curious grin-like appearance (**risus sardonius**). As a rule, a considerable degree of fever is early manifested, but in some few cases no rise occurs until near the end. Great difficulty in the administration of nutrition is experienced. Spasms of the muscles around the injured part may be the first sign of the disease; but soon spasmodic contractions of the trunk and extremities develop, accompanied by cramp-like pains. When fully established, they may be excessively painful and violent, and the remissions between them but partial. They can be excited by any form of stimulus, such as the slamming of a door, a draught of cold air, or some voluntary movement, and are always of a tonic (i. e., continuous) character. The body is contorted in various directions, and respiration much impeded by the fixation of the thorax. Occasionally the body is arched backwards by the contraction of the muscles of the back, the abdomen being firm and tense—"as hard as boards"; sometimes it is doubled forwards, and in rare cases laterally. The muscles may contract so violently as to be ruptured, whilst teeth have been broken and the tongue almost bitten off. The intellectual faculties usually remain clear to the fatal end, which is generally due to exhaustion from a repetition of the convulsions, or more rarely to

asphyxia induced by a prolonged fixation of the respiratory muscles. Before death the temperature sometimes runs up to 108° , or even, in one case, to 112° F., and it often continues to rise for a degree or two after death; such hyperpyrexia is mainly due to the continuous muscular contractions. The surface of the body is bathed in sweat, and the urine usually albuminous. Death may occur in twenty-four hours from the onset of the disease, or not for four or five days.

Chronic Tetanus usually begins later after infection, is less severe in its symptoms, and more likely to be recovered from. The course is usually afebrile, and the spasmodic contractions may be limited to the wounded part of the body whence the infection has arisen, or may be general.

The **Diagnosis** of tetanus is rarely difficult. In the early stages it must be distinguished from simple **trismus** arising from dental irritation, or from inflammatory stiffening of the jaw-joint. This may be readily accomplished by noting that there is also present in tetanus incipient rigidity of the neck muscles. In the later stages of **strychnine poisoning** there is a very similar group of symptoms, but the contractions are more sudden and violent, the relaxation of the muscles between the spasms complete, so that the mouth can readily be opened, whilst the hands are involved in the contractions, a rare sign in tetanus, and the muscles of mastication often escape.

No difficulty should be experienced in distinguishing tetanus from **hydrophobia**, owing to the very different nature of the convulsions in the latter case; moreover, they affect the muscles of respiration and deglutition, whilst the history of the case, the early hallucinations, and the absence of tonic muscular contractions, are also characteristic features.

The **Prognosis** is, as a rule, unfavorable in any case. The longer the case lasts, and the lower the temperature, the more likely is the patient to recover, whilst high fever, sleeplessness, delirium and squinting are bad signs.

Treatment.—Careful antisepsis applied to wounds is the surest means of **preventing** its occurrence, and the worse the sanitary conditions in which patients are found, the stricter should be the measures employed. In ordinary surgery tetanus is exceedingly uncommon, except when following a contused, punctured or lacerated wound which has not been efficiently dealt with, and especially when mud or dirt has been ground into it.

When it arises from a septic wound which is accessible, either the wound should be freely excised or the limb amputated; but even then

the tetanic convulsions may remain for a time, or even prove fatal, from the poison already circulating in the system. Where such measures are impossible, or when the disease is well established, the treatment of the future will probably be the inoculation of a specific tetanus antitoxin. At present the results of this treatment are distinctly disappointing, in that no case of acute tetanus has been saved by it, and the effect even in the more chronic cases is not at all certain. Improvements, however, are sure to be made, and then we may hope for better things.

The ordinary means of treatment consist in **keeping the patient absolutely quiet**, and free from all sounds or disturbances of any kind. Food should be nutritious, fluid, and unstimulating; it has been suggested to feed the patient twice a day by a stomach-pump, under chloroform. When the trismus is very marked, the patient may be fed through the nose by a rubber catheter passed into the pharynx, unless there is a sufficient gap between the teeth to admit of its entrance. Opium, chloral hydrate and bromide of potash have been vaunted as beneficial drugs, but probably cases which have recovered after their use would have done so without. Chloroform may be administered to control the spasms.

Hydrophobia, or Rabies.

Hydrophobia is an acute general infective disease, transmitted from animals to men, especially from rabid dogs, wolves, etc. It consists in an affection of the central nervous system, and one of its most marked features is the long and variable incubation period. It never originates itself, either in animals or man. Although the actual virus has not yet been isolated, there can be no doubt that it is a micro-organism. The poison exists in the secretion of the salivary glands, in the blood, spinal cord and brain, tear-passages, pancreas and other organs, and, indeed, appears to be widely diffused throughout the system. Infection most usually follows a bite; but if the teeth pass first through a garment, the virus may be wiped off, and the individual may escape. Also if an infected animal merely **licks** an abraded surface the disease may be transmitted, even when the animal has not at the time shown any of the more typical signs of rabies.

In the **Dog**, rabies manifests itself three to five weeks after infection, but the period varies considerably; the original wound usually heals perfectly, or there may be some inflammation about it. Two chief varieties have been described—the raging or maniacal, and the quiet or dumb. **Rabies with frenzy** commences with a stage of depression, which is manifested by great snappishness and irritability, especially towards other animals, by a characteristic restlessness, and by the dog moping in dark corners, with a depraved appetite, eating any kind of rubbish or dirt, and even its own excreta. This period lasts for two or three days, and is perhaps the most dangerous, since there is nothing very suggestive about the symptoms. It is followed by a period of frenzy and maniacal fury,

and this in turn is succeeded by a stage of paralysis, going on to death. During the whole attack the mouth is filled with ropy saliva, which the animal vainly tries to scratch away; the bark loses its ring and becomes hoarse, and as the disease progresses paralysis of the lower jaw becomes evident; finally, after



Fig. 250.

A dog in the raving mad or violent stage of hydrophobia (rabies or madness).

partial or general convulsions, the animal dies, five or six days from the onset. In the melancholic or dumb form the animal dies more rapidly, passing through the same stages as the above, with the exception of the maniacal period. The disease lasts but two or three days in this variety.

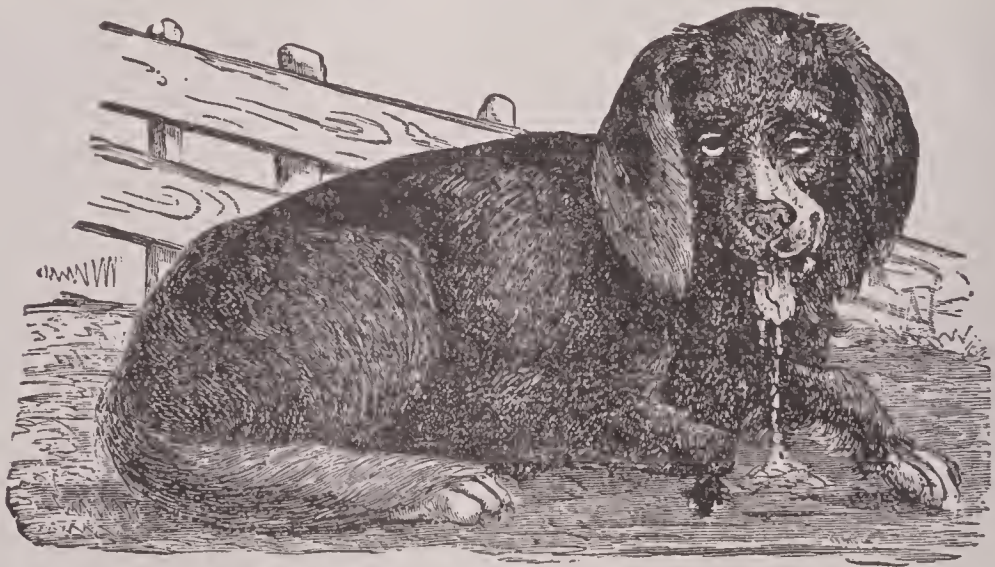


Fig. 251.

A dog with quiet or paralytic hydrophobia.

In Man the incubation period of this disease is most variable, lasting from days to months or years, but as a rule it does not exceed six weeks. During this interval the wound heals, although the scar may remain tender and neuralgic. The disease is ushered in by a vague sense of terror, with illusions of the senses and disturbance of the mind, lasting for about twenty-four hours. Restlessness,

sleeplessness, loss of appetite, and a repugnance to fluids follow. Perhaps there may be some febrile disturbance, but this is not very excessive. The more characteristic symptoms of the disease are inaugurated by a convulsive stiffness of the tongue, neck, and especially of the muscles of swallowing and respiration, which becomes more marked if any attempt is made to swallow. These convulsions are not continuous in character, and thus differ from those of tetanus; they become more and more generalized, being after a time brought on by almost any afferent impulse, however slight—such as a blast of cold air, a flash of light, a sudden noise, especially such as is caused by the movements of fluids; whilst swallowing is quite impracticable. The mouth is usually filled with ropy mucus, which is very difficult to remove. The respirations become catchy, and a hiccupping noise may be produced by the spasm of the diaphragm, which is sometimes thought to resemble the barking of a dog. Finally, the convulsions may entirely cease, and the patient dies, retaining his consciousness to the end, the fatal issue being due to the destructive changes taking place in the brain, or to exhaustion; it may, however, occur earlier, from spasm of the glottis. The disease lasts about a week, but may be more rapid, killing even in two days.

Preventive Measures should be adopted in all cases of bites from dogs which are either rabid or may possibly become so. The circulation in the limb should be arrested by a string or bandage, free bleeding encouraged, and some powerful caustic, e. g., a red hot iron, nitric acid or pure carbolic acid, applied. A free excision of the part is, however, preferable. The importance of such immediate treatment rests on the fact that the infective virus is absorbed with the utmost rapidity. Thus, Pasteur injected some of the hydrophobic poison into the ear of a rabbit, and immediately afterwards cut it off; rabies, however, developed as usual.

Pasteur's Preventive Treatment.—More recently, however, M. Pasteur discovered the fact that the injection of an attenuated virus in increasing doses, and in gradually increasing strength, will protect an animal or individual from the disease, and, marvelous to state, will even catch up the poison already inoculated, and save the patient from its subsequent development, if too long a start has not been given. The method employed is as follows: A virus of constant and maximum intensity is first obtained by passing the poison from a dog through a series of rabbits, until the disease appears with regularity on the seventh day, all parts of the cord being then equally virulent. The material inoculated is obtained by mashing up a portion of the spinal cord or brain of the diseased dog in sterilized broth, and injecting it with a hypodermic syringe beneath the brain covering after trephining. All that is now needed is to take a series of these virulent cords, and dry them by hanging in a glass bell-jar with some caustic potash at the bottom for variable periods of time, the virus being thus weakened in its intensity, until at the end of fourteen days it is completely destroyed. Individuals are inoculated with portions of such cords, pounded up in sterilized broth, beginning with the weakest, and gradually increasing the strength of the injection, until a preparation of a cord which has merely hung one day is used. This method of treatment was introduced in 1885, and the results hitherto obtained have been such as to indicate that we have here a most potent preventive agent against hydrophobia. Up to the end of 1893, 14,430 patients had been treated at the Pasteur Institute in Paris, and, excluding cases where the patient died during or immediately after the treatment, only 72 deaths occurred, giving a mortality of

0.50 per cent, instead of 15 per cent, which is the usual death-rate following bites from rabid animals treated in other ways. In all probability, however, the precaution of muzzling dogs when any outbreak of this disease occurs is much better than inoculation before or after the individual has been bitten. When the disease has attacked an individual, only **palliative treatment** can be adopted. All sources of irritation and disturbance must be removed, and the patient kept absolutely quiet. With a view to diminish the spasms, chloral may be administered internally, or chloroform inhaled, or cocaine sprayed on the fauces. All the nourishment that the patient can possibly take should be administered, with the addition of stimulants.

Anthrax.

This disease occurs in man as a result of infection with the *Bacillus anthracis*, which produces in animals, especially in sheep and cattle, the so-called "splenic fever." If the microbe is inoculated through the skin, it produces a form of carbuncle as a "**malignant pustule**," or **charbon**, although occasionally a condition known as "**malignant**" or "**anthrax oedema**" arises from the local infection; whilst if it is absorbed by the lungs or intestinal canal, it originates a **general inflammatory disorder**, known as "**woolsorters' disease**," or **anthracæmia**.

Some animals are immune against the attacks of anthrax, especially the dog and rat; and one of Pasteur's most useful discoveries was that of artificially providing immunity for cattle and sheep by inoculating them with an attenuated virus, obtained by exposing a cultivation for some time to a high temperature.

Diseases due to the infection with this organism usually occur amongst **graziers** who tend the living animal, or **butchers** who deal with the carcass; it is also met with amongst **workers in hides or wool**.

Malignant Postule commences as an angry red pimple at the site of inoculation, which rapidly spreads, whilst the center becomes covered with vesicles. There is no pain associated with this stage, but only great itching and irritation. As it extends, the central part becomes gray, and finally black, whilst around it upon an area of deep brawny congestion and swelling is a narrow ring of vesicles. Generally there is a certain amount of fever and malaise, which does not become pronounced until about the fourth day. Occasionally a case runs a favorable course, limiting itself to the local manifestations, which gradually clear up.

Woolsorters' Disease (or anthracæmia) is the general condition resulting from the development of these bacilli in the body, where no local injury occurs. The virus gains access to the system either by the dried spores being inhaled, or through the lining of the bowel. If they enter the respiratory tract, the patient complains of fever and malaise for a few days, and then a pneumonia is set up, and with it a serous pleurisy. This runs a rapid course, with high fever, great dyspnea, impairment of the circulation, and finally collapse. If the bacilli enter the stomach, they are usually destroyed by the acid chyme; but should any of them or their spores reach the intestine, the alkaline contents form a suitable breeding ground, and the walls of the gut are soon attacked and the constitution affected. Colic, cramps, vomiting, and blood-stained diarrhea are the most marked features in such a case.

The **Treatment** must be active and energetic, where possible. In the local affection, free excision of the patch, and the application of either the actual

cautery or of pure carbolic acid, is the only hope. For the general disease, merely symptomatic treatment can be adopted. Recently, de-emetized ipecacuanha has been much recommended, both as a local application after excision, and also internally in woolsorters' disease.

Tuberculosis.

Tuberculosis is a condition resulting from the development within the tissues of the body of structures known as **tubercles**, and caused by the growth and activity of the **Bacillus tuberculosis**. Before the fact was established that such lesions were the result of the development of a micro-organism, they were usually termed **strumous** or **scrofulous**. Even at the present day these two terms are occasionally employed to indicate that condition of constitutional weakness which **predisposes** to tubercles. It is better, however, to avoid the use of such misleading terms.

The **Causation** of tubercle may be considered under four general headings:

1. The **individual is often predisposed** to the development of this disease by some inherited weakness or "vulnerability." This is indicated by the fact that parents, relations or ancestors have suffered from some similar affection, or that it has occurred in other branches of the same family. Various forms of physiognomy are supposed to be characteristic of a tubercular disposition, and although not always present, these appearances are not unfrequently observed. Two chief varieties are described, viz., the **sanguine** and the **phlegmatic**. In the former the individual is slight and well proportioned, possessing a thin, delicate skin, often freckled, and so transparent that the subcutaneous veins are readily seen. The hair is fine and auburn-colored, or even reddish, the conjunctivæ thin and pearly, the eyelashes well developed, and the fingers long and tapering. Such children are usually excitable and precocious in their habits, and possess taking manners. The phlegmatic type, on the other hand, presents a short, stunted stature, with somewhat coarse features, and strong though somewhat short limbs. The skin is coarse and muddy-looking, the lips thick, the hair rough and brown. Occasionally these two types are conjoined, constituting what is known as "pretty struma." In such children of either type there is a considerable tendency to the development of eczema of the skin, inflammation of the mucous membranes, and an enlargement of the lymphatic glands, all of which are simple in nature, but may constitute a suitable nest for the development of tubercle, especially if the child is run down by some preceding illness, such as measles or scarlet fever. They also suffer

frequently from cracked lips, and as a result of the irritation caused thereby considerable infiltration and thickening may follow. Although tubercular disease is most frequently seen in young people or children, no age is exempt from its attacks, even elderly persons being affected by what is known as senile tuberculosis. These senile manifestations differ in no way from those met with in the young.

2. **Unhealthy surroundings and bad hygiene** certainly predispose to its development; hence it is perhaps more commonly seen in the poor than in the rich, although it is not rare amongst the latter, arising usually as a result of improper feeding and want of fresh air in the case of children, and not unfrequently from faulty hygiene or carelessness, especially as to judicious clothing, in adults.

3. A **local nidus**, or nest, suitable for the development of the micro-organism must, as a general rule, be present. Tubercular infection occasionally follows wounds and punctures in previously healthy parts. Thus, as already mentioned, lymphatic glands in a condition of chronic congestion and enlargement form a suitable breeding-ground for the bacillus, as also bones and joints which are in a state of congestion as a result of slight and often overlooked injuries.

4. The real cause of tuberculosis is the **Bacillus tuberculosis**. This organism, which was originally isolated by Koch, is always present, though not always recognizable, in the products of the disease. It exists in the form of fine straight rods. These are cultivated artificially with great difficulty, growing best on coagulated blood serum at the temperature of the body, and even then but slowly. The organism gains admission to the system in a variety of ways, either **through some abrasion of the skin**, or by the **digestive tract with some article of food, especially milk**, or by **inhalation into the throat and lungs**. The contagious nature of the disease has been abundantly demonstrated during the last few years. Thus, it can be readily transmitted by inoculation to animals, especially to rabbits and guinea-pigs. Transmission of the disease to the human subject has frequently occurred from direct inoculation through a puncture or abrasion of the skin, as in the case of surgeons whose fingers have been wounded whilst operating on tubercular cases.

The **structure** of a fully-developed tubercle is as follows: In the center lies a large cell, containing a large number of nuclei, which are often arranged around its periphery, or grouped together at one or other pole. Delicate processes extend from this "giant" cell, and form a fine network, in the meshes of which are situated the cells of the surrounding zone. These are rather larger than ordinary leuco-

cytes, or white blood-cells. Around them are collected a large number of smaller cells, probably leucocytes, and these merge into the surrounding structures, which are gradually changed into granulation or fibrous scar tissue. No vessels are present in the tubercle, and as a result degenerative changes are certain to follow. Not infrequently a number of these tubercles develop close together, and under these circumstances the intervening structures disappear, being replaced by granulation tissue, which may in part become further transformed into scar-tissue. By the use of appropriate staining reagents it can be demonstrated that bacilli are present.

If the disease progresses **caseation**, or the change of the tissue into a **cheese-like** substance, always ensues, owing mainly to the defective nutrition of the part, but also possibly arising from the specific action of the bacillus or its products.

The ultimate result of the tubercle depends to a large extent on the general health of the individual and the treatment which is adopted.

1. If the parts are kept at rest, and free from external irritation, and if the constitutional weakness is removed by suitable measures, the destructive process may come to an end. In such a case **the peripheral layer of granulations is converted into a dense fibrous tissue**, which forms a sort of capsule, and checks the advance of the disease. **The cheesy material is either removed by leucocytes, or becomes calcified—that is, charged with lime—usually leaving a firm fibrous nodule**, perhaps interspersed with calcareous particles. Possibly some of the tubercular material persists in a latent state in this mass, like an “**extinct volcano**,” ready to be lighted up into activity if the opportunity is given. In less advanced cases the diseased tissue may be so completely removed as to leave scarcely any trace of its existence behind.

2. More commonly the caseous material is transformed into **pus**. In such cases a chronic or subacute tubercular **abscess** results.

One of the chief features of tubercular disease is its great tendency to **diffusion**. This may occur (a) **locally**, as a result of direct continuity of tissue, or possibly by its extension along neighboring lymphatics or blood-vessels; or (b) **distant viscera** or organs may become infected, probably as a result of **dissemination by the blood-vessels**. Thus tubercular phthisis is a not uncommon sequence of a similar affection of bones, joints, or lymphatic glands. (c) Moreover, any tubercular lesion may lead to the occurrence of **acute general tuberculosis**, in which the disease is scattered widely throughout the

body, giving rise to rapid emaciation, high fever of an intermittent type, and usually severe diarrhea, dyspnea, and delirium or coma. A fatal issue follows in the course of a few weeks. This is known as "galloping consumption."

Lupus is universally acknowledged at the present day to be tuberculosis of the skin. It is met with in children and young adults, rarely commencing after the age of thirty. **Its most common situation is the face, usually starting at some place where the skin and mucous membrane are continuous**—e. g., the edge of the nose or the inner canthus. It is rare on the scalp, but fairly frequent on the trunk and extremities. The mucous membrane of the nose and mouth is also liable to be attacked, but in such cases the disease usually spreads to it from the skin.

The earliest manifestation of lupus consists in the formation of one or more shot-like nodules in the deeper layers of the skin, which are surrounded by a zone of redness and thickening. These nodules are not particularly hard to the touch, but when of any size are of a brownish-yellow tint, especially if they are compressed by a glass, appearing then somewhat of the color of apple jelly. Gradually the process extends, and usually more rapidly in one special direction, following the course of the vessels. At the same time the skin is gradually infiltrated and transformed into granulation or fibrous tissue, covered by a layer or two of epithelium, and ulceration is very liable to follow. In the extremities the growth not infrequently takes on a warty aspect.

A **Lupoid Ulcer** tends to spread at one margin as it heals at the other, and hence **under typical circumstances** may be found to be of a **crescentic shape**, although this is frequently interfered with by various causes. Any scar which results from natural processes of cure is always thin and very vascular, easily breaking down from any slight irritation. The process extends gradually, and usually slowly, from the seat of its first appearance, being, as a rule, distinctly limited to the skin; but **when it attacks the nose, the cartilages are often involved** and destroyed, causing a lopped off appearance of the nose, whilst if it extends to the palate or septum nasi, perforation is very likely to ensue. The disease is practically **painless**, and leads, as a rule, to no deterioration of the general health. Neighboring lymphatic glands may become enlarged with a tubercular deposit, but this is not a common occurrence. Left to itself, it tends sooner or later to come to an end, the ulcerated parts healing, but leaving indelible traces of its ravages in the shape of obvious scars, with

often considerable loss of substance. Occasionally it may persist, in spite of treatment.

The **Diagnosis** of lupus from syphilitic and other destructive affections of the skin turns on the presence of **outlying nodules** beyond the spreading edge of the lesion, together with the **apple-jelly-like granulations**, and the **thin, congested character** of any **cicatricial tissue** present, whilst the **slow though continuous progress**, and the **tendency to heal at one part as it spreads at another**, are also suggestive of its presence. The **age and character** of the individual, and the persistence in many cases of the disease in **spite of treatment**, must also be taken into account.

The **Treatment** of lupus consists in the use of powerful light, known as the Finsen light treatment. Special electric lamps are necessary and the treatment can be carried out at places specially equipped. The light cure is the only thing that will end the disease promptly and leave little or no disfigurement.

Tubercular Ulcers result from the breaking down of a **subcutaneous focus**, and hence may be connected with diseases of bones, joints, lymphatic glands, or simply of the connective tissues. Whatever their origin, they are characterized by the same features, viz., an irregular and ragged margin with undermined and congested edges; the base is formed by pulpy granulation tissue containing caseous masses of tubercle.

The **Treatment** necessarily consists in the removal both of the unhealthy and undermined skin, and of the tubercular tissue beneath it.

Tuberculosis of Bowel, Air-Passages, Eye.

Tubercular Disease of Mucous Membranes may be met with affecting either the alimentary, respiratory, conjunctival, or genito-urinary tract. It always commences with the formation of tubercular nodules in the tissue beneath the surface layer. As these increase in number and size, caseation follows, and frequently also suppuration, the abscesses bursting through the mucous membrane, and giving rise to shallow ulcers with undermined edges. Where practicable, they should be dealt with in the same way as tubercular ulcers of the skin.

GLANDERS.

Glanders is primarily a disease of the horse, ass, or mule, which is transmitted to men by direct inoculation, and hence is usually seen only in stable attendants and those brought in contact with animals. It is characterized by the develop-

ment of inflammatory swellings under the lining of the air passages, which break down and ulcerate, and by the formation of similar growths in the lungs and other organs.

There is now no doubt that the disease is due to a definite micro-organism, the *Bacillus mallei*.

In **Horses** and other animals, glanders manifests itself by a formation of larger or smaller rounded swellings in the lining membrane of the nose, and sometimes of the lower air passages. These break down and ulcerate, giving rise to a thin, sero-purulent discharge, whilst the ulcers may be very extensive, and even cause destruction of the bones and cartilages. The lungs become implicated and deposits form, which soften and suppurate, as in the case of tubercle. The spleen, liver, and kidneys may be affected in the same way. In addition, the lymphatic glands become enlarged and pass through similar changes, leaving ragged and foul ulcerated surfaces, those under the jaw being first invaded. The same process also involves the lymphatic trunks, constituting the so-called "corded veins," whilst the enlarged glands are known as "farcy buds." The disease runs either an acute course, killing in six or twelve days, or is more frequently chronic, lasting perhaps for years.

In **Man**, glanders usually starts about the hands and face, but occasionally in the mucous membrane of the nose. In the acute cases the incubation period lasts from three to five days, and is succeeded by the occurrence of uneasiness and fever disturbance, followed by severe pains in the bones and joints, similar to those in acute rheumatism. The place of inoculation becomes swollen, and suppuration and ulceration follow. The lymphatics leading from this to the nearest glands are enlarged and inflamed. These phenomena are succeeded by a copious papular eruption on the skin, which somewhat resembles small-pox, but each papule goes on to the formation of an ulcer. It is not an uncommon feature of these sores, when placed over a bony surface, to involve the periosteum and lay bare the subjacent bone. Similar changes occur in the viscera, muscles, and joints, and being associated with high fever. In such cases death may ensue in seven to ten days.

In **Chronic Glanders** similar symptoms are met with, but the course is slower; there is little or no fever; the disease is less extensive, and intermissions are not uncommon. Total recovery is stated to occur in 50 per cent of the cases.

It is important to determine the **Diagnosis** as early as possible, in order to undertake energetic local treatment. From **acute rheumatism** it is to be distinguished by the presence of the local lesions, which in turn may be distinguished from **small-pox** by the presence of the characteristic bacilli in the discharge, by the fact that they more extensively involve the subcutaneous tissues, and by the absence of the characteristic umbilication or dimpling that appears on the top of the elevations in small-pox. The chronic cases resemble syphilis and tuberculosis, but the history of the patients, and their exposure to infection from animals suffering from the disease, is most important. Also the result of cultivations made from the discharge help to show the true nature of the disease.

Treatment can only be of use when undertaken early, and before general infection has ensued. The local foci are to be thoroughly removed, either by the knife or by scraping and applying some active cauterizing agent. The same treatment should be adopted in chronic cases.

LEPROSY.

Leprosy is a chronic infective disease, due to the *Bacillus lepræ*. It is characterized by the formation of granulation-like formations, which tend to ulcerate, and usually arise in connection with the skin and nerves.

Leprosy, though formerly common in this country, is now but rarely seen, and has then usually been imported. In Iceland, Norway, Russia, and in the East, it is still frequently met with, although the compulsory separation of lepers enforced in Norway is much diminishing the number in that country. As to its causation, but little is known; it is not caused by an exclusively fish diet, because it is rife amongst certain races where fish is either forbidden or unobtainable. It is apparently contagious, though even this is denied by some authorities; and there is considerable difficulty in settling the matter, owing to the unusually long incubation period—perhaps years. Opinions differ also as to whether or not it is transmitted by heredity: and although up to a recent period it was generally conceded that the father could pass it on, even this is somewhat doubtful.

Prognosis—The disease is almost invariably fatal, although a few cases have been known to recover.

ACTINOMYCOSIS, OR “LUMP-JAW.”

Actinomycosis is a disease mainly of cattle, but occasionally seen in man. It is due to the growth of the “ray fungus” (*actinomyces*), a kind of plant.

The fungus is transmitted to animals with their food, having been found most often within the husk, or sheath, of barley. It usually attacks the tongue or jaw, turning these into hard infiltrated masses (the “wooden tongue” of cattle), in which, after a time appear many abscesses, which discharge externally, and leave a diffuse inflammatory mass riddled with sinuses. The pus from such abscesses is of the usual type, but in addition contains firm yellowish gritty bodies (which can be isolated by the fingers), consisting of masses of the fungus.

In **Man** the disease occurs much more commonly than was expected when attention was first drawn to it, and is probably due to direct inoculation with the fungus from fresh corn which has been chewed or eaten. It has been found in the tongue and upper jaw, causing diffuse hardening and suppuration; in the lungs, in various parts of the intestinal canal, especially the vermiform appendix, and in the skin. Wherever situated, either a localized tumor, or a diffuse mass arises, in which abscesses form and open at many spots. The bones are affected equally with the soft parts, and may be extensively destroyed. In itself the process is not dangerous, but may become so by involving important organs. The commonest site for it is close to the angle of the jaw, constituting a tumor, the appearance of which is tolerably characteristic. At first the mass has a smooth, regular, and even surface, and merges gradually into the surrounding tissues; the skin over it is usually hyperæmic, that is, reddened by excess of blood.

The **Treatment** most recently advised consists in the administration of large doses of iodide of potassium, which seems to have almost as great an influence in this disease as in syphilis. At the same time, surgical measures may be employed; in fact, it must be treated in exactly the same way as a diffuse tubercular mass. This can, however, only be very partially carried out in the visceral affections. Sulphate of copper given internally has been used recently with marked success.

INSTRUCTION SIX—*Tumor and Cysts*

Subject Reference

For *Cancer of Lips*, see page 156.
To *ngue and Throat*, 165-170.
Breast, see pages 179-182. *Bowel*, see page 195. *Rectum*, see page 213. *Bladder*, see page 223. *Stomach*, see page 404.

Simple Tumors—Cancerous Growths—Cysts

Cause of Tumors Almost Unknown. Probably Due to Injury, Irritation, Infection or Hereditary?
(Predisposition of the Patient to their Development.)

Tumors.

The term "tumor" is applied generally to **any abnormal swelling** which may be met with in the body. But for scientific purposes its application is much more limited. A tumor may be defined as "a mass of new formation that tends to grow or persist, without fulfilling any physiological (i. e., **useful**) function, and with no typical termination." The fact that it has no typical termination distinguishes it from inflammatory overgrowths, which always tend sooner or later to the formation of scar, or some modification of it; inflammatory growths, moreover, may disappear completely, and often temporarily diminish in size. Pure hypertrophies, or overgrowths, are excluded by this definition, since they always depend more or less on some increased physiological function, and are composed of an increased development of **normal tissue**, as, for instance, the blacksmith's biceps muscle.

As to the **Causes** of tumors but little is known. Probably they are all in the first instance local developments, and may be started to grow by some **injury** or **irritation**, which causes abnormal development of some of the tissues of the part. Thus, a blow on the breast is often responsible for an adenoma, a kind of cancer; the irritation caused by smoking a clay pipe may produce epithelioma (a form of cancer) of the lip, and many other illustrations will readily suggest themselves. Moreover, even if, as supposed by some pathologists, the cancers result from parasitic **infection**, it is probable that some local irritation or breach of surface is needed to allow entrance to, or cause the activity of, the organisms. The **hereditary** nature of some malignant tumors is often mentioned as an evidence of their constitutional origin; but although it may indicate a predisposition of the patient to their development, some local condition may usually be found to determine it. Tumors may be due to some excessive growth occurring in small portions of undeveloped embryonic material, or **fetal**

residues, left among the normal tissues. These may remain in a condition of suspended activity, until some local injury excites their development. In all these conditions, then, **some local irritation is present**, and a constitutional condition or blood change, if present at all, is merely a predisposing factor.

Tumors may be divided into two great classes, viz., (i) the **benign** and (ii) the **malignant**.

i. **Benign, Innocent or Simple Tumors** are strictly local, are more or less exactly limited in size, or are surrounded by a fibrous covering, and result from a proliferation of all the cells constituting their structure. There is no tendency to infiltrate or invade surrounding tissues, which are merely pushed aside and compressed, giving rise to pain and other symptoms due to pressure, although the tumor itself is painless. The capsule is formed by an ensheathing layer of tissue, caused by the chronic irritation and inflammation engendered by their growth and development; hence they are usually removed with ease, and recurrences are uncommon. They are not unfrequently multiple, that is, several occur at once, and may be hereditary; but these characters are no evidence of a constitutional taint. They never give rise to a fatal issue, except when their continued growth causes pressure on important structures.

ii. On the other hand, **Malignant Tumors**, if not removed by operation, are almost invariably fatal. The following are their chief characteristics: (1) The primary growth is usually single, rarely multiple. (2) It tends to progress steadily and constantly, but with varying rapidity in different cases. (3) The local development is characterized by an infiltration of the surrounding tissues (that is to say, the cells of the tumor spread in among the cells of the surrounding parts), which are gradually replaced by the tumor substance. A capsule is thus rarely formed, or, if at all, only in the early stages, and hence the limits of the growth are not clearly defined. Moreover, many varieties tend to spread locally along the lymphatics, and hence, although the growth may appear to have been completely removed, recurrences are very common, owing to the non-removal of these prolongations (or, as they are termed, "roots") of the disease into apparently normal tissue. IF A MALIGNANT TUMOR, WITH ALL ITS RAMIFICATIONS, IS COMPLETELY REMOVED, IT DOES NOT RECUR. The impossibility of knowing whether all the growth has been removed, or how far it has extended into the surrounding tissues, is responsible for the frequent manifestation of recurrences. (4) When a malignant tumor invades the skin, it usually

leads to ulceration, and then not unfrequently a foul mass like a cauliflower may result. (5) Secondary growths are usually found in neighboring lymphatics or distant organs to which the cells of the tumor are carried by the lymph or by the blood. (6) A general wasting is produced, as a result partly of the pain, partly of the pressure of the growth on important structures, interfering with their function, and in part possibly due to the absorption of poison products developed in the tumor. The patient looks thin and emaciated, the face drawn and with an appearance of suffering upon it; the appetite is impaired, and the skin often sallow and earthy-looking. (7) Finally, death ends the scene, after a longer or shorter period of suffering.

The degree of malignancy varies with different tumors. In some the local¹ phenomena predominate, whilst in others the constitutional symptoms are the more important. Thus, rodent ulcer is slow in its progress, and produces no deposits of cancer in the internal organs; it destroys life merely by implication of vital parts. Melanotic or black sarcoma, on the other hand, may produce only a small primary growth, but the most numerous widely diffused secondary deposits may form in the viscera. The sarcomata are very frequently disseminated by the blood-stream, and hence secondary growths are not common in the lymphatic glands, whilst the carcinomata or cancers spread by means of the lymphatics. The term **semi-malignant** is sometimes applied to those growths which are on the borderland between the malignant and benign.

The Classification of Tumors is partly anatomical, partly embryological; the following groups are:

I. Tumors derived from **mesoblastic**² tissue, or, as it may be termed, the **Connective Tissue Group**:

- (1) Embryonic connective tissue tumors:
 - (a) Myxoma (mucoid tumor).
 - (b) Sarcoma (tumor like very young tissue).
- (2) Fully-developed connective tissue:
 - (a) Lipoma (**fatty tumor**).
 - (b) Fibroma (**fibrous tumor**).
 - (c) Chondroma (**cartilaginous tumor**).
 - (d) Osteoma (**bony tumor**).
 - (e) Myoma (**muscle tumor**).

¹“Local” means manifested or occurring in the immediate vicinity or part.
 “Constitutional” means involving the whole body.

²“Mesoblastic,” “epiblastic” and “hypoblastic” refer to the layers of tissue in the embryo (or very young animal).

- (f) Neuroma (tumor in connection with **nerves**).
- (g) Angioma (tumor composed of **blood-vessels**).
- (h) Odontoma (tumor connected with the **teeth**).
- (i) Lymphadenoma, or lymphangioma (tumors of **lymphatic origin**).

II. Tumors derived from epiblastic or hypoblastic structures, or **Epithelial Tumors**:

(1) Innocent varieties:

- (a) Papilloma (**wart-like** growth).
- (b) Adenoma (**glandular** new formation).

(2) Malignant growths (the **true cancers** or **carcinomata**):

- (a) Epithelioma (**cancer of skin** or mucous membrane).
- (b) Rodent ulcer (cancer of **sebaceous glands**).
- (c) Columnar carcinoma (cancer arising from tubular glands, e. g., Lieberkuhn's follicles, or from ducts lined with columnar epithelium).
- (d) Acinous carcinoma (cancer arising in glands with spheroidal epithelium).

Some kinds of carcinoma are benign. Other kinds are very dangerous, because of the rapidity of their growth and the readiness with which they are scattered throughout the body by the cells which the blood carries along. The **Treatment** consists in as early and complete removal as possible. A surgical operation is the usual way to do this. In cases which can not be operated on, a successful result may follow the use of **Coley's fluid**. This contains the poisons of erysipelas, but the germs of erysipelas are killed before using it. The fluid is injected into the tumor and the young cells of the new tissue are killed by it, whilst the older normal cells of the part are not killed.

A **Lipoma** is a fatty tumor occurring usually in the skin. The latter dimples when pinched up over the tumor. Removal by the knife is the proper treatment.

Of other non-cancerous tumors or "new growths" the **Angioma** is the most common. It is formed chiefly of numerous widened blood-vessels and usually occurs in the skin as a red patch ("birth-mark" is the popular name for it). The color is bright red if arteries are the kind of vessel in it, and dark red if veins predominate.

Papillomata are overgrowths of the skin or other surface covering. Warts and corns are the common form in the skin. On moist surfaces within the body they are larger and softer and may bleed easily. They occur in the bladder, kidney, intestine, and vocal cords.

Adenomata are excessive growths of glands, such as the breast,

They are not dangerous, as a rule, and grow but slowly, except in some instances, when their large size may cause injurious pressure.

Carcinoma.—The **malignant forms** of epithelial new growths are generally known as **cancers** or **carcinomata**, of which the following varieties occur, viz., epithelioma, rodent ulcer, columnar carcinoma, and glandular or acinous cancer.

The essential character of a cancerous growth consists in an unlimited multiplication of the epithelial cells of the organ invaded. In some cases this may result in the formation of a superficial outgrowth, while deep processes or columns of cells advance into the tissues along the lymphatic channels, and even burst through the basement membrane, or membrane that bounds the glandular cells. The irritation causes inflammation about the cancerous growth, by which the normal tissues are disintegrated and removed, and a fibrous structure of variable density developed around the epithelial outgrowths. Speaking generally, cancerous tumors are less vascular than sarcomata, although there is a greater amount of redness immediately around them. A considerable degree of pain, usually of a neuralgic type, is often complained of, owing to the pressure on nerves in the growth, and to their subsequent destruction. The tumors are, however, not necessarily tender to the touch.

Causes.—A vast amount of work has been undertaken with the object of determining the cause of cancer, although at present but little advance has been made. Formerly the disease was considered to be of **constitutional** origin, resulting from some morbid condition of the blood, and in favor of this idea was the immense difficulty of eradicating it, as also its hereditary nature in many cases. On the whole, however, this theory has been discarded in favor of one which maintains that it is primarily **local** in origin, and probably the result of the inoculation and development of some specific organism—some definite living thing. The chief arguments in favor of its local origin are as follows: (1) That it often occurs in individuals who, up to the time of its onset, have been in perfect health; (2) that wasting symptoms generally only manifest themselves in the later stages of the disease, being then due to excessive pain, the absorption of poison, loss of blood, or possibly the poisonous effect of some material absorbed from the growth; (3) that the original tumor is always single, multiple tumors being the result of infection from the primary growth; (4) that some definite focus of local irritation may frequently be traced as the cause of the tumor—e. g., the irritation of the lip by a short clay pipe, the presence of ulceration of the tongue, resulting

from ragged teeth or syphilitic affections, etc. It is also interesting to note that cancer usually involves the intestinal canal in situations where there is a sudden change of caliber, giving rise to increased friction from the passage of the contents—e. g., at the upper and lower ends of the gullet, the lower end of the stomach, the ileo-cecal valve, or junction of the small and the large bowel; either end of the sigmoid flexure, the lower end of the rectum and the anus. (5) Moreover, if an early and thorough operation is undertaken, the growth can be completely removed from the system, whilst even if it recurs, it tends rather to attack the rear or the neighboring glands, indicating that the removal has been incomplete.

The infective nature of cancer is still doubtful. Evidence exists to indicate that cancer may be transmitted from one person to another, but it is somewhat scanty. It has been shown that in certain houses (called "cancer houses") one set of indwellers after another has been attacked by this disease. **Experimental** research, as to the transmissibility of cancer from one individual to another, is necessarily unobtainable, although it has been proved that, in a person already suffering from cancer, a portion of the growth transplanted to a distant part of the body will grow, and lead to the formation of a similar tumor at the site of inoculation. Attempts have also been made to transmit the disease to animals, but with a very slight degree of success, even in cases where the point of inoculation has been previously irritated. Hence the view that cancer is due to infection depends rather on the analogy of the disease to other chronic infective disorders than on any well ascertained facts.

Epithelioma (Squamous Epithelioma, Epithelial Cancer).—By this term is meant a cancerous tumor growing from skin or mucous membrane.

Epitheliomata are usually met with in **middle-aged** or **elderly** individuals, although occasionally they may be seen in young adult life. Any portion of the skin may become the site of this tumor, as also the mucous membrane of the mouth, pharynx, and œsophagus, and that lining the genito-urinary tract. It commonly results from some **long-continued irritation**, as in the lip or tongue, whilst **epithelioma of the penis** is always associated with a long foreskin. Old scars, especially if they break down and become ulcerated, are likely to be invaded.

It may be looked on as a **malignant wart**, which tends not only to grow outwards from the surface, but also to burrow deeply into adjacent tissues; sooner or later ulceration follows.

The disease, as a rule, early infects neighboring lymphatic glands, which become the seat of a similar growth, and tend sooner or later to involve the skin and give rise to characteristic ulceration. Ulceration into the main vessels of the neck may also follow, and lead to death from hemorrhage; otherwise the fatal event is due to wasting and exhaustion.

Rodent Ulcer is a cancerous tumor, commencing probably in the sebaceous glands. It is usually met with in elderly patients, though occasionally observed in those under forty, and is seen with special frequency on the upper two-thirds of the face, the skin below the



Fig. 252.
"Rodent ulcer" of the face—a
kind of skin cancer.

inner and outer corners of the eye being the chief seats of election. It commences as a papule or flat-topped nodule in the skin, surrounded, perhaps, by an area of redness, which gradually and slowly progresses. The infiltration extends in all directions, but the ulceration usually keeps pace with the new growth, and, indeed, frequently exceeds it. The ulcer has a smooth but somewhat depressed surface, is perhaps covered with granulations, and bounded by a slightly-raised, indurated, rolled-over edge. In the later stages one can often detect evidences of the new formation beneath the skin beyond the edge. If kept aseptic, or clean, there is but little discharge, and imperfect attempts at healing are often observed, the scar, however, readily breaking down again; but where the surface is allowed to become septic, it is often covered with sloughs, and an abundant offensive discharge may result. The condition is painless; neighboring lymphatics are not enlarged, and the general health does not suffer, except in the later stages. The progress of the case is slow, but

continuous, and although it tends to spread superficially rather than deeply, sooner or later deeper structures become involved, and nothing hinders the destructive process, even the bones of the skull being cleanly eroded, and the brain-covering exposed.

The **Treatment** of rodent ulcer consists in excision when practicable, the defect being made good by granulation and skin-grafting, or by an operation to shift adjacent parts of the skin. Where such cannot be undertaken, the ulcer may be thoroughly scraped, and the surface treated with nitric acid or some similar caustic.

Columnar Carcinoma.—This affection is in the majority of cases a **glandular cancer**. It is met with most frequently in the alimentary canal, arising from any portion of it in which columnar epithelium occurs, and usually originating as an overgrowth of Lieberkuhn's follicles. These grow outwards from the surface in the same way as a papilloma springs from the skin, but also penetrate deeply into the submucous and muscular coats. A similar type of growth occurs in the cervical portion of the uterus, and occasionally arises in the ducts of the breast. It is also met with in the upper jaw, originating in the tubular glands of the mucous membrane lining the antrum of Highmore.

Glandular or Acinous Cancer.—Glandular cancer may be looked on as a malignant form of adenoma. The tumor is hard or soft in consistence, and slow or rapid in growth. To the former type the term **Scirrhus** is applied; to the latter, **Encephaloid**. A third variety, known as **Colloid**, is really due to degenerative changes of a special nature.

Scirrhus is met with most frequently in the breast, but also occurs in the prostate, pancreas, and pyloric end of the stomach. On naked-eye examination a scirrhus tumor appears as a hard nodular mass, the limits of which are imperfectly defined.

Encephaloid or Medullary Cancer is a growth of a similar nature. It constitutes a soft, rapidly growing tumor abundantly supplied with blood-vessels, and tending very early to affect neighboring lymphatic glands. The skin over such a tumor is stretched, with dilated blue veins coursing over it. Ulceration occurs early, and from this surface a foul, bleeding, fungating mass sprouts up. Encephaloid cancer is met with in the breast, testis, kidney, and a few other glandular organs.

The **Treatment of Cancer** always consists in its removal by operation when practicable. If such is done in a thorough manner and at a sufficiently early date, a good result may follow; but, owing to the tendency of all cancers to spread along the lymphatics, its entire

removal is a matter of the greatest difficulty. Recurrence is therefore very liable to ensue.

In all cases where removal of the disease by the knife is impracticable, owing to its extent, it may sometimes be possible to remove a portion of the disease, the remainder being dealt with by caustics. Of these the most satisfactory is chloride of zinc, which is usually applied as a paste, a little opium being added to allay pain. In other cases it has been proposed to starve the growth by tying the chief nutrient artery, and to diminish pain by cutting the sensory nerves; such can, however, only give the most temporary relief.

Of recent years other methods have been suggested for the treatment of malignant disease that can not be operated on—e. g., the injection of pyoktanin or methyl violet, or of various bacterial products, such as Coley's fluid. Sufficient evidence is not yet forthcoming to determine the practical value of these proceedings. There is no doubt, however, that sarcomata are more readily thus influenced than cancers.

In hopeless cases, all that can be done is to keep any ulcerated surface free from irritation, and if possible aseptic, whilst the general health is maintained by suitable diet and drugs, and excessive pain is kept in check by the administration of opium or morphia.

Cysts.

By a cyst is meant a more or less rounded cavity, with a distinct lining membrane, distended with some fluid or semi-solid material. The term is used somewhat loosely, being applied to a variety of manifestations which it is extremely difficult to classify, owing to the fact that conditions which are pathologically similar in origin are sometimes termed cysts in one part of the body, and not so in another. For practical purposes, however, they may be grouped as follows:

I. Cysts of **embryonic origin**, or arising in connection with embryonic remains.

II. Cysts arising from the **distension of pre-existing spaces** (distension cysts).

III. Cysts of **new formation**.

IV. Cysts of **degeneration**.

I. **Cysts of Embryonic Origin, or Arising in Connection with**

Embryonic Remains.

I. The most important cysts to be considered under this heading are those known as **Dermoids**. These are characterized by the exist-

ence in normal situations of cavities lined with epithelium, from which may be developed any form of cutaneous appendage—e. g., hairs, nails, teeth, etc.—whilst the space is usually occupied by sebaceous or mucous contents. The structure of the lining wall is very similar in nature to skin or mucous membrane, consisting of stratified epithelium, from which a considerable growth of sebaceous glands and hair follicles often takes place.

II. Cysts Due to the Distension of Pre-existing Spaces.

Retention Cysts arise from obstruction to the escape of some natural secretion from a gland duct or tubule. The cavity thus formed is lined with epithelium, whilst, owing to the irritation produced by the tension, a fibrous wall of variable thickness is developed outside. There is often a considerable tendency to the formation of growths within the cysts, especially in the breast, whilst the contents generally consist of the dried secretion, perhaps mixed with blood.

Retention cysts may develop in connection with any ordinary glandular tissue, viz., Mammary Cysts, Renal Cysts, Ranula, Pancreatic Cyst. Here we need only refer to mucous and sebaceous cysts.

Sebaceous Cysts occur on any part of the surface of the body, but especially the scalp, and are due to obstruction of the duct of a sebaceous gland. They present in the shape of rounded swellings, firm and elastic to the touch, movable on the deeper structures, and always attached at one spot to the skin. On careful examination, the obstructed mouth of a sebaceous follicle can usually be seen, and possibly some of the contents of the sac squeezed through this opening. The cyst wall is formed by several layers of epithelium, surrounded by dense tissue, and if exposed to irritation or pressure, as when situated on the back or shoulder, and rubbed by the braces, it may become very firmly adherent to the surrounding parts. The material contained within is of a cheesy consistency, yellowish-white in color. Occasionally the exudation oozes through the duct, and dries on the surface; layer after layer of this desiccated material collects, finally giving rise to what is known as a **Sebaceous Horn**. These become dark in color from admixture with dirt, and always more or less fibrillated in texture, whilst the base is hard and reddened. Sebaceous cysts sometimes inflame and suppurate. When the skin has given way over them, the contents are only partly discharged, and the remainder undergoes putrefactive changes, giving rise to a horribly offensive ulcerated surface, which may readily be

mistaken for epithelioma, and spreads rapidly. True malignant disease of an epitheliomatous nature is sometimes said to occur.

Diagnosis.—From a **dermoid cyst** it is known by the fact that the dermoid arises early in life, and is sometimes congenital, whilst it is hardly ever directly attached to the skin. From a **fatty tumor** it is recognized by the absence of lobulation, and by its more solid character, whilst a lipoma is softer and more moveable. From a **chronic abscess** it is distinguished by the existence of the dilated orifice, by its firmer consistency, and by the history.

Treatment.—A sebaceous cyst should be entirely and completely removed if giving rise to any inconvenience or trouble. Horns and fungating ulcers should be excised with the surrounding skin.

Mucous Cysts arise in connection with the glandular follicles found in mucous membranes, much in the same way as sebaceous cysts originate in the skin. They are often due to injury, and are rarely of great size, consisting of thin-walled cavities distended with mucus; they are elastic to the touch, and usually translucent, and are most often seen on the lips, beneath the tongue, or sometimes on the labia vulvæ or os uteri. All that is needed in the shape of treatment is to open and excise them.

Cysts of New Formation are such as occur apart from any embryonic condition or pre-existing cavity. The following varieties occur:

An **Implantation Cyst** is one which arises from the accidental intrusion into the tissues of epithelial cells which retain their vitality, and are enabled to develop a cyst very similar in nature to a dermoid; in fact, it may be looked on as an **Acquired or Traumatic Dermoid**. Such an occurrence is usually brought about as the result of an injury, especially from punctured wounds; thus, cysts of this nature have been met with in the fingers or palm of the hand as a consequence of the penetration of some sharp instrument, whilst they are also occasionally seen in the anterior chamber of the eye, following an operation. They are, moreover, observed in the axillæ (or what corresponds to the armpit) of cattle, as a result of goading them with some sharp implement. The signs and treatment are similar to those of a dermoid cyst.

Cysts sometimes form around foreign bodies, which thus become encapsuled.

Blood Cysts are sometimes of doubtful origin. Some of them certainly arise from extravasation of blood, and in such cases coagulated blood is found within, the cavity being perhaps lined with

laminated fibrin. In many cases a so-called blood cyst really consists of a soft sarcoma, into which hemorrhage has occurred.

Parasitic Cysts are produced by the irritation caused by the growth within the tissues of certain living organisms. Thus, in the disease known as trichinosis, derived from eating unsound pork, the **Trichina spiralis**, a small round worm, develops in large numbers in the voluntary muscles, and becomes surrounded by a capsule which is subsequently calcified.

The most important of these parasitic cysts is that arising from the development within the body of one stage of a tapeworm, the **Tænia echinococcus**, giving rise to what are known as **Hydatid Cysts**. This disease is infinitely more common in Australia than in this country. The **Tænia echinococcus** is a minute tapeworm, less than half an inch in length, which inhabits the intestinal canal of dogs; it consists of four segments, the posterior one larger than the rest of the body, and containing the genital organs. When mature, this last segment becomes filled with ova, which are discharged, and these find their way into the human stomach by the media of water or uncooked vegetables, such as watercress, which have been contaminated with the dog's excreta. The process of digestion sets the embryo free, and by means of a crown of little hooks which it possesses, as well as four suckers, it is enabled to bore its way through the walls of the stomach, and thence travels by the blood-vessels either to the liver or to any other part of the body. As a result of the irritation caused by its presence, a sac forms. The organs usually affected by hydatid disease are the liver, kidneys, and brain, but any part of the body may be attacked.

Cysts of Degeneration arise in connection with tumors, especially those where the blood-supply is not very abundant.

INSTRUCTION SEVEN—Wounds

Wounds Requiring Surgical Treatment

PUNCTURED WOUND

(Produced by Needle Entering Hand or Foot and Broken Off.
Needle May Travel to Any Part of the Body.)

Subject Reference

For Hydro-
phobia or Wounds
from Dog Bites,
see pages 49, 50,
51.

The commonest form of punctured wounds met with are those produced by **needles**, which are frequently broken off short in the body. These usually occur about the hands, feet, knees, or buttocks, and may lead to subsequent trouble. If seen soon after the injury, it is advisable to undertake their immediate removal, a pro-

ceeding sometimes exceedingly simple, but occasionally necessitating a deep and difficult dissection. Should the needle not be removed, it frequently travels about the body along the muscular and fascial planes, and there is no knowing where it may lodge or come to the surface, or how long it may remain in the body. It may occasionally find its way into the pelvis of the kidney, and constitute the nucleus of a renal calculus, or possibly, if it enters the gall-bladder, it may cause inflammation and give rise to a formation of gall-stones.

For the detection of penetrating foreign bodies of a metallic nature, or of splinters of glass or stone, the newly discovered X-rays of Röntgen are exceedingly valuable. They are produced by passing a powerful electric current through a modified Crookes tube, or, as it is now termed, a "focus tube." This consists of a thin glass tube shaped somewhat like an incandescent lamp, into which are fixed two terminals—one, the negative, concave, and the other, or positive pole, a platinum plate set at an angle so as to reflect the rays generated at the negative end to the convexity of the bulb. A very high

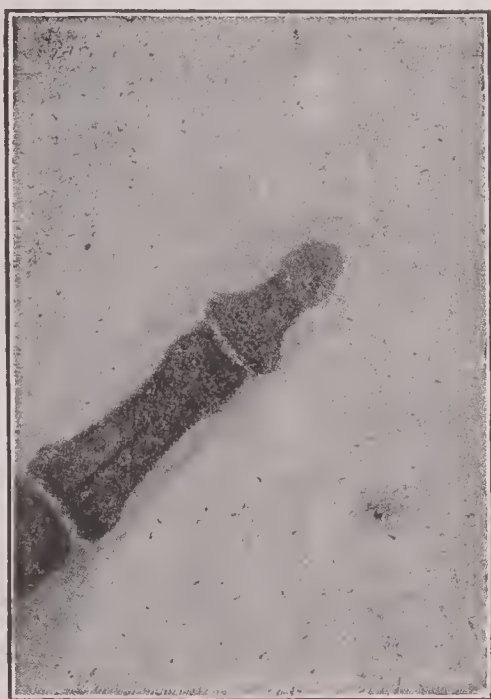


Fig. 253.

An X-ray picture of a woman's thumb showing a needle that was not known before to be there.

vacuum must be present in the tube. If now the limb with the supposed foreign body within it is placed over a dark slide containing a sensitive dry plate, and the tube just above it, so that the convex portion on which the rays impinge is nearest the limb, a skiagram is produced which, on development, shows the osseous tissues, the outline of the limb, and the foreign body, if it exists.

A modification of this process has led to the production of the

Cryptoscope. This consists of a cardboard screen coated with platino-cyanide of potassium or tungstate of soda, and if employed instead of a sensitive plate on the further side of the limb to the tube, the appearances produced can be seen by the naked eye. Since it is possible in this case to move the limb from side to side, or to rotate it, a better idea can be obtained of the position of the foreign body; by simple skiagraphy, it is often impossible to tell on which side of a bone the foreign substance lies.

Healing of Wounds.

In former days five different methods of repair were described. Increased knowledge and further research have proved that there is but one method of repair. It, however, is modified according to the conditions of the wound, but the process is the same whatever tissue of the body is involved, be it bone, muscle, tendon, or subcutaneous connective tissue.

The **general facts as to the process of repair** may be stated as follows: The margins of the wound are always bounded by an area of tissue in a state of lowered vitality, even if no bruising or sloughing of the parts is present. A certain amount of hemorrhage has occurred, and the divided vessels are plugged up with clots as far as the next patent branches, which in their turn are slightly dilated, partly as a result of this obstruction. The surface of the wound is generally covered with a film of lymph or blood-clot, whilst any spaces left in the interstices of the tissues are similarly filled with clot.

(a) The first stage in the process consists in an abundant assembling of small round cells, presumably leucocytes, whose function is to remove all dead or damaged tissue, as well as to break up, disintegrate, and finally absorb, any blood-clot which may be present. These cells probably come from the surrounding vessels, and are accompanied by a certain amount of watery oozing, so that we have here the early manifestations of a slight inflammatory reaction, which, if it does not extend beyond certain limits, is a beneficial proceeding. Thus there is always a little redness about even the cleanest wound, such as a razor cut. Should it, however become excessive, as when sepsis is present, injurious results may follow.

(b) The exudation of leucocytes is soon followed by the appearance of a number of larger cells; these are termed **fibroblasts**, and are supposed to be the active agents in the process of repair. These soon form a layer of cellular tissue which lies upon or between the surfaces

or lips of the wound, whilst the previously effused leucocytes disappear, some finding their way back into the circulation, and others serving as food for the nutrition of the fibroblasts.

(c) The **vascularization** (that is, formation of blood-vessels) of this layer forms the next stage in the process. This is brought about by the outgrowth from the walls of the nearest capillaries of solid rods of protoplasm, which appear first as minute buds, but rapidly increase in length, and may be single or double. They soon bend over to unite with similar threads growing out from other capillaries, or with the wall of another vessel, or occasionally they unite with the vessel they started from. After a time these protoplasmic threads become hollow, and a communication is established between them and the mother vessel, so that blood passes into them. The new capillary wall soon becomes lined with definite endothelial cells, and strengthened by the connective tissue which forms around it. By this means a soft vascular tissue is produced, known as **granulation tissue**, consisting of loops of capillaries supported by a number of large cells. There is a varying amount of homogeneous substances between the cells. This soon becomes converted into fibers.

(d) The **transformation** of this granulation tissue into **fibro-catricial** tissue, or **scar**, is next proceeded with. By the contraction of the fibers the cells become flattened out and compressed, and the

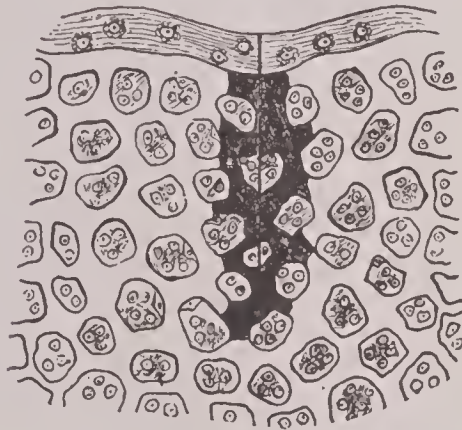


Fig. 254.

Diagram of healing "by first intention." The network of channels represents the blood vessels and the black part is clotted blood along the plane of the wound. A very small scar results.

newly-formed vessels constricted, so that as time passes the scar tissue becomes less and less vascular, and consequently paler, firmer and denser, as well as smaller.

(e) Whilst this last stage is in progress, the surface of the wound is covered with cuticle, which spreads inwards from healthy epithelium in the neighborhood of the wound, and especially from the deeper layers.

The general process of repair sketched above is modified slightly

according to the character and condition of the wound. Four chief modifications are met with:

1. **Healing by First Intention or Primary Union** occurs in cleanly-cut wounds where the lips are unbruised and brought together, so

Fig. 255.

Diagram of a fresh open wound. The blood is clotted in the vessels opening into the wound and so there is no further bleeding. The adjacent vessels are dilated.



that no collection of blood or discharge between them is possible, whilst asepsis, or perfect cleanliness, is also maintained. There is but a very thin line of damaged tissue, which is easily absorbed, and the process runs a typical course as sketched out above, union being completed in about a week.



Fig. 256.

Healing by granulation. The surface of the wound is covered by lymph containing many white blood cells. Loops of new blood-vessels are forming and projecting into the wound.

2. **Healing by Granulation** (or **second intention**, as it used to be termed) is met with (1) where there has been definite loss of substance, so that the lips of the wound are not, or cannot, be brought together, or (2) when the surface of the wound is bruised or damaged so that portions of tissue have to separate by sloughing, or (3) when sepsis has prevented primary union.

When there is a simple loss of tissue, with no bruising or damage to the tissue, the course of events is as follows: The blood-stream in the superficial capillaries having been arrested, adjacent ones become dilated, and from these plasma and leucocytes escape. The plasma clots on the surface and forms a layer of fibrin, entangled in the meshes of which are a number of white corpuscles, so that the wound becomes covered with a film of whitish-yellow material known as "lymph." This increases gradually in amount and thickness, and is soon converted into granulation tissue, the process occupying from four to seven days.

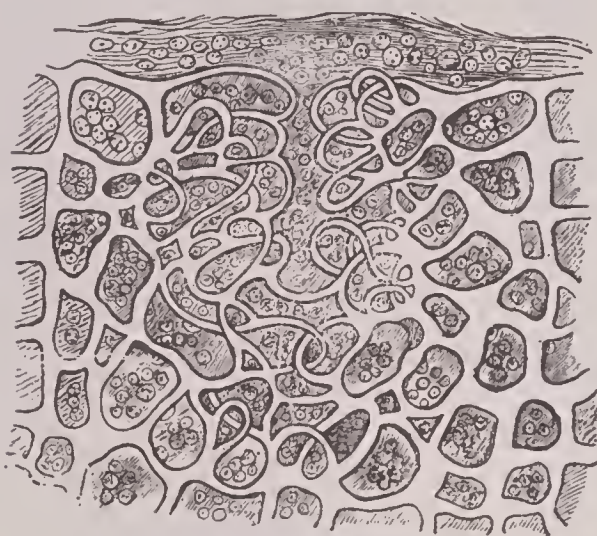


Fig. 257.

Later stage of healing by first intention. Loops of new blood vessels have formed and are beginning to bridge over the division in the tissues. Many white cells are in and about the wound and scar tissue is forming to bind the parts together.

The healing of a healthy granulating wound is brought about by the deeper layers changing into scar-tissue and by the surface becoming covered with cuticle. The contraction that occurs in scar-tissue brings about two results: (i) The surface area of the wound is diminished in all directions. This is most important in the healing process, since if the base is adherent to some dense resisting structure repair is slow and difficult, and the wound may remain open as a so-called **chronic ulcer**. (ii) The depth of the wound is diminished. If the base of the wound cannot be raised, the cicatrix is usually depressed and adherent to the underlying parts.

During the process of repair the wound takes on the appearance already described as characteristic of a healing ulcer.

3. **Healing under a Scab** can only be permitted in very small wounds, such as superficial grazes and abrasions, and is practically identical with the granulating process. Instead of an artificial dressing, the wound is covered by a scab which consists of clotted blood or dried exudation. Such healing is only possible when asepsis exists;

otherwise pus is likely to accumulate beneath the scab and give trouble.

4. **Healing by Organization of Blood-clot** is only observed in strictly aseptic wounds where there is definite loss of substance, as in the deep channels made in the treatment of bones thickened by chronic inflammation. Blood is allowed to collect and coagulate so as to fill the cavity, and the surface is covered to prevent irritation from the dressings. The dark clot shows no trace of change for some days, but gradually the peripheral portions become granular and yellowish-white in color; these in turn have blood-vessels formed in them and are transformed into granulation tissue, which spreads over the whole surface, and then healing occurs as described above. The clot is absolutely passive in this process, merely serving as a basis of support or scaffolding for the building up of the granulation tissue which replaces it.

A **Scar** is a mass of fibrous tissue covered by epithelium, which has been formed by nature in the repair of a wound. It is at first vascular and hence red, and contains numerous cells. After a time, as contraction continues, the cells become flattened out, fewer in number, and the intercellular fibrous tissue more abundant, and the vessels constricted, so that finally a scar becomes well-nigh bloodless and **white**. Superficially its color changes from red to white, and if of small size it may almost disappear, but never absolutely, unless the subcutaneous tissue has not been opened into. When the parts around at any later time become reddened by any cause, such as sharp friction, the white scar becomes again evident by contrast.

Scars may become troublesome by:

1. **Excessive contraction**, which may cause deformities. Such is often seen after large burns on the face, arms or hands.

2. **Overgrowth**, forming what is termed a "**Kiloid**." The best treatment is to leave it alone. It will likely disappear in time.

3. **Ulceration** may occur after a scar is well formed and retard the healing.

4. A scar may become **painful** from pressure on nerves. An operation is necessary to relieve the pain.

5. **Malignant disease** may develop in scars. It is usually slow and painless until it extends into healthy tissue around. It should be removed by operation as in the case of any cancer.

The question of **Amputation** will sometimes be raised in dealing with the graver forms of lacerated wounds, and although many limbs are now saved which would inevitably in former days have

been sacrificed, yet still occasionally no other treatment is possible. Hard and fast rules cannot be laid down as to when to amputate and when not to do so; each case must be treated on its own merits. Apart from the local damage, the following points will have to be carefully considered: (a) The **age and vitality** of the patient. An old person has much less recuperative power than a young one, and hence a damaged limb may often be left in a youth which one would certainly remove in an elderly person. The vitality of the individual is perhaps even more important than the age, for some men at sixty are in a much more healthy and resistant state than others at forty. The habits, as to temperance, etc., must also be taken into consideration, and the existence of general diseases such as diabetes or albuminuria. (b) The vitality of the **extremity** injured. A leg has to be sacrificed much more frequently than an arm, since the vitality and reparative power of the latter are so much greater. (c) The **septicity** or not of the wound is of the greatest significance, since, if infection can be prevented, the chances of preserving the limb are much improved, and one would then often delay operation, whereas sepsis would turn the scale in favor of operation at once.

As to the local conditions which may suggest or determine the performance of an amputation, there are two groups, viz., (i) where amputation is **essential**, or (ii) where it is **doubtful**.

Amputation is certainly called for—

1. To trim up the stump of a limb torn off by machinery, or cut off by the passage of a railway train over it, or carried away by a cannon-ball.
2. When the whole limb or one complete segment of it has been totally disorganized, or crushed to pulp, though still retaining its connection with the body.
3. In cases where gangrene is imminent or has supervened.
4. When severe septic symptoms, or those of incipient pyemia, or sometimes those of tetanus, are manifested in a case where an attempt is being made to save the limb; or when exhaustion supervenes from prolonged suppuration.
5. In severe compound contusions of the foot involving the bones and laying open the common joint cavity. Here the better plan to adopt, as a rule, is to amputate. The distance of the foot from the center of the circulation increases the likelihood of gangrene, especially in old people.

Amputation is **doubtful** in the following conditions:

1. Compound comminuted fractures in parts other than the foot.

The final decision will mainly depend on the age, condition, and previous habits of the individual.

2. When the soft parts have borne the brunt of the injury, and have been extensively stripped from the bones, amputation is by no means an essential, provided that they can be restored to the original position, that there is a reasonable probability of their vitality being maintained, and that the utility of the limb will not be hopelessly impaired after the wound has healed. The surgeon has here to carefully balance the risk run by the patient if an attempt is made to save the limb, and the value that the limb if saved will be to him subsequently. For instance, when the muscles of the forearm have been extensively torn up in a machine accident, he has to satisfy himself, even if the vascular supply is satisfactory, whether it is worth while exposing the patient to the risk of grave sepsis, when it is probable that under the best circumstances the limb will be of little practical use.

3. Laceration of the main artery of a limb need not in itself determine amputation; but if in addition to this the bones, veins, or nerves, are injured, and especially in the lower extremities of old and feeble folk, amputation should be undertaken without delay.

As to the **Period** when a limb should be removed after an accident, there is no doubt that, as a general rule, the sooner amputation is performed, the better; the longer it is delayed, the greater the risk of septic infection and absorption. Moreover, experience tells us that, if the limb is removed before reaction from the initial shock is fully established, the impression upon the system is often less severe than if the operation is deferred. On the other hand, the shock in some cases may be so profound that it is better policy to delay interference until reaction is established; this is especially the case in severe crushes close to the hip joint. At the same time, if in the opinion of the surgeon shock is being perpetuated by the presence of a crushed limb, it should be immediately removed.

Hemophilia.

Hemophilia is a congenital (or hereditary) disease, characterized by a tendency to persistent and uncontrollable bleeding from slight wounds, whether open or subcutaneous. This condition is often associated with bleeding into the joints. Such individuals are known as "Bleeders." The **family history** of such a case is always interesting, the disease being usually transmitted by the females to the males of a succeeding generation, whilst the former often escape entirely. The **cause of this affection has not been ascertained**, no change in the vessels or con-

stitution of the blood having yet been discovered. Unless hæmorrhage is actually occurring, nothing abnormal is noticed, but any injury is sure to be followed by excessive bleeding; spontaneous subcutaneous bleedings frequently occur, as also bleeding from the mucous membranes. Hence **no operations must be undertaken on such patients unless absolutely urgent**, even such a small matter as the extraction of a tooth having proved fatal. Physician should be consulted.

INSTRUCTION EIGHT—*The Arteries*

Subject Reference

For Heart Disease, see pages 467-470.

Apoplexy, page 446.

Heart Failure High Blood Pressure

Diseases and Injuries of the Arteries.

Inflammation—Swelling.

Arteries are not often badly bruised, as they readily slip aside and so escape. They may be torn partly or entirely across. Sometimes a communication forms between an artery and a vein. The latter is not able to stand the higher pressure to which it then is subjected and it dilates, forming a "varicose vein" that pulsates.

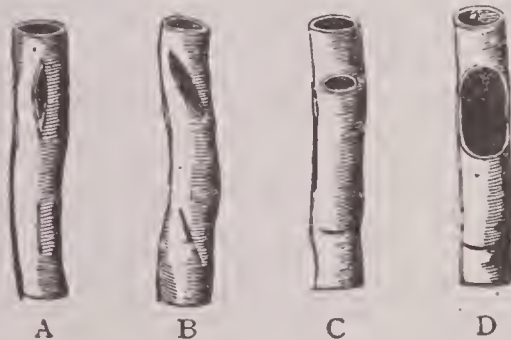


Fig. 258.

Wounds of arteries. The line below on each artery shows the direction and size of the cut, and the hole above shows how the artery gapes in consequence. An artery that is cut *partly* across will bleed much longer than if cut completely across.

Inflammation of the artery wall may occur as a result of injury, infection or plugging by a clot. Syphilis, tuberculosis and alcohol are the commonest causes of inflammation of arteries. In old age (either natural or premature) the artery walls become thickened and their elasticity is lessened. Hence they are not as well adapted to their work of circulating the blood, in which the elasticity plays an important part. Such thickened arteries may be hardened and stiffened by lime deposited in their walls. These calcified arteries are easily ruptured, especially when the artery is not well supported by

the surrounding tissue; for instance, in the brain, where rupture of an artery is the cause of apoplexy, or "paralysis." Or the arteries in the wall of the heart may be fragile and a sudden strain may rupture one and cause "heart-failure," with sudden death. "A man is as old as his arteries," is a true statement. The way to keep your arteries young is to live a healthy life—avoid strains; keep the bowels regular by proper diet, etc., and the skin healthy by frequent bathing, and the kidneys active by drinking lots of good water on rising and at bedtime. In these ways poisons are quickly removed from the body, and they are a very common cause of thickening of the arteries. Also avoid exposing the body to such poisons as alcohol, tobacco, syphilis, lead, etc.

Apoplexy may be pressure, and either avoided or long prolonged. **High blood pressure** is the chief cause of it. This may be detected by having the pressure occur every four or five years. The pressure is measured accurately as follows: A rubber tube is fixed around the arm near the shoulder, like a bracelet. It is then inflated (and so compresses the arm and its large artery) until the blood is shut off and no pulse can be felt at the wrist. The pressure on the arm at this time is measured by an attachment to the rubber tube. Any abnormal increase of the pressure that is found calls for simpler living, less meat and lighter diet all round, closer attention to the action of the bowels and kidneys, and, if possible, a visit to a good watering place every year for a fortnight or so.

Aneurism is a distension of an artery to form a swelling. The latter may be detected on the surface or it may be so deep in the body (especially the chest) as to be beyond observation. It is due either to changes in the wall of the artery or to increase in the blood-pressure.

Symptoms.—There is a tumor or swelling, which pulsates, and is made tenser by compressing the artery on the far side (of the tumor) from the heart; it becomes softer when the artery is compressed above it so that no blood reaches it. The inlaying artery may press on nerves and cause pain or paralysis; if the nerves to the voice-box, or larynx, are pressed on, the voice is altered or lost. Similarly the breathing may be more or less obstructed by the pressure on the wind-pipe.

The **treatment** is in the hands of the surgeon. He ties the diseased artery or may cause a clot to form on it and fill it up where it is dilated.

INSTRUCTION NINE—*The Veins*

Subject Reference

For *Varicose Ulcer*, see page 23.

Varicocele (Enlarged Veins), see page 235.

Diseases of the Veins

Clotting, Plugging, Inflammation, Varicose Veins, "Birth-Mark" or "Mother's Mark."

The chief diseases of veins are:

Thrombosis, or internal clotting.

Embolism, or plugging.

Phlebitis, or inflammation.

Varix, or varicose veins, and

Nevus, "birth-mark," or "mother's mark."

Thrombosis, or clotting of the blood in the vein, is due to one of several causes:

1. Changes in the wall of the vein.
2. Changes in the constitution of the blood, as after childbirth.
3. Slowness of the blood-current, as when a vein is pressed on by a tumor.

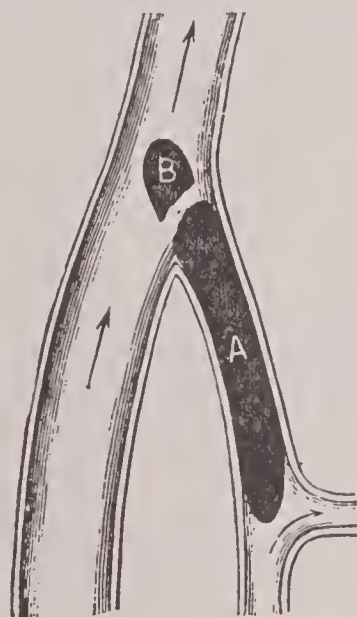


Fig. 259.

How an *embolus* is formed: B, part of a clot (or *thrombus*), A, in a blood vessel, becomes detached, is swept along in the blood till it lodges in a narrower vessel, plugging it. If the clot is infected an abscess will form where the clot lodges.

After fevers, such as typhoid, and acute rheumatism, when the blood is altered and the heart is weak, clots may form at places where the veins are pressed on or slightly injured by some unnoticed occurrence. This occurs most commonly in the veins of the leg, causing "milk leg," or "white leg." The leg swells up very much. This may happen also after childbirth.

An **Embolus** is a clot which becomes detached and is carried along in the blood-stream until it lodges again, producing the condition termed **Embolism**. If a large clot is thus suddenly carried through

the heart and lodges in the artery of the lung, plugging it, instant death may result. The effects, of course, vary according to the size of the vessel plugged and the region of the body affected. It is usually an artery (or the vein going into and dividing up in the liver) that is thus plugged. This is one cause of apoplexy, in which a piece of clot may become detached from the interior of the heart (or from some vein and then pass to the heart) and being carried up the carotid artery and into the brain it may there suddenly shut off the blood supply of a large part of the brain and instantly destroy its powers. If the part of the brain affected is **motor**—that is, controls movements of parts of the body—a paralysis results. Recovery may follow, and usually does, but is not always complete.

The artery of the **retina** may be plugged, causing sudden, total blindness, for which there is no remedy.

If a small vessel in the **lung** is blocked, there is sudden pain, together with shortness of breath and other signs of lung trouble.

In the **liver** an embolus causes sudden sharp pain under the lower right ribs.

In the **spleen** an embolus causes sudden pain in the left side, the spleen swells and there may be some rise of temperature.

The **kidney, intestine, legs and arms** are also liable to have arteries blocked with symptoms of a more or less serious nature, especially in the case of the intestine.

Phlebitis.

Phlebitis, or inflammation of the vein wall, may rise from a variety of causes, and is not uncommon. The following occur:

1. **Simple Phlebitis**, in which a more or less **localized** inflammation of the wall of a vein is attended by clotting; it extends for a variable distance up and down the vessel, but usually not further than the next branches. (a) It may arise from **injury**, either subcutaneous or open, or from the continued irritation of a tumor or aneurism; (b) it may be **spontaneous in nature, and then usually attacks the larger veins of the lower extremity, or vessels which have long been varicose, especially in gouty individuals.** The blood usually clots first in one of the pouches behind a valve in the vein; (c) it may also follow thrombosis; or (d) it may be induced by an inflammation of the tissues around the vein.

2. **Infective Phlebitis** is a much more serious condition, inasmuch as the clot resulting therefrom is always invaded by micro-organisms, and the disease is often of a **spreading** type. It was this form of

phlebitis which in the old days so commonly followed operations, and made surgeons fear any interference with veins; it has now been almost banished as a result of surgical operations by antisepsis, and there is no more fear of dealing with veins than with any other tissue of the body. It may, however, arise (a) in injury where asepsis has not been attended to or has failed, the organisms invading the clot which lies in the open mouth of the vein; or (b) as a result of septic inflammation around a vein, as in wounds, or more commonly in septic inflammation of bones. The usual results are localized or spreading suppuration in the course of and around the vein, and general pyemia; (c) it may also be induced by infection of the clot present in simple phlebitis.

In the more favorable cases the spread of the infection may be limited by the ends of the clot remaining firm and unaffected.

The **Symptoms** of inflammation of a **superficial** vein are sufficiently obvious. The vessel becomes swollen, hard and painful, with enlargements, or knobs, corresponding to the valves, or to the pouches in varicose veins. The skin over them may be dusky and congested, and there may be some edema (or swelling) of the region from which the blood flowing in the vein is gathered; this, however, rarely amounts to much. If suppuration occurs, the signs of abscess are noted; on opening this care must be devoted to keeping the part aseptic in order to prevent, as far as possible, the occurrence of spreading inflammation and pyemia.

When the **deeper** veins are involved, it may be impossible to feel them, but the acute deeply-seated pain and marked edema are characteristic evidences of what has occurred. The edema is of a more or less solid character, similar to what is seen in "white leg," in which probably lymphatic obstruction plays a part. Occasionally there is marked swelling of the whole limb. Obliteration of the vessel may result.

The onset of **Septic Spreading Phlebitis** is marked by fever and rigors, whilst the local signs are more severe, and the edema is more extensive and rapid in its onset.

Treatment of Simple Phlebitis.—The limb must be kept absolutely at rest to limit the inflammation, and to prevent the detachment of pieces of the clot, and also elevated to assist venous return. Locally the parts may be painted with glycerine and extract of belladonna, swathed in a thick layer of cotton-wool, and lightly bandaged. The patient should be kept on an unstimulating, though nutritious, diet, and the general health attended to. When every sign of inflam-

mation has subsided, and sufficient time has been allowed for the absorption or organization of the clot (six to eight weeks), massage may be commenced, to assist in the removal of swelling and local thickening, and an elastic bandage may be serviceable in restoring the circulation. If abscesses form, they must be dealt with antiseptically.

Varicose Veins, or Varix.

A vein is said to be **varicose**, or in a condition of **varix**, when it has become permanently dilated, with thickening and more or less tortuosity of its walls. The superficial veins of the leg, especially on the inner side of the leg and behind the knee, are those perhaps most commonly affected; the spermatic veins are often in a similar condition, constituting what is known as a varicocele, and piles are due to varicosity of the veins of the lower part of the rectum. We shall here only deal with the first of these three manifestations.



Fig. 260.

Varicose veins in the leg. These are much dilated veins, and are common in the lower limbs.

Causes.—Varix is induced by any condition which leads to a frequently repeated or more or less permanent distension of a vein, such as prolonged standing, as in those serving behind counters; the pressure of tight garters, especially if worn below the knee; prolonged or forcible exertion of the limb, as possibly in cyclists, whereby the blood is driven from the deeper into the more superficial veins;

the pressure of a pregnant or displaced uterus, or of a pelvic tumor; or obstruction to the deeper veins. Any abnormal communication between an artery and a vein also causes varicosity, from the inability of the latter to withstand the arterial blood pressure. Moreover, chronic constipation often hinders the return of blood from the lower limbs, whilst inherited weakness, or the relaxation of system due to sedentary habits, must also be looked on as predisposing causes. The tendency to varix increases with age till the middle period of life is reached.

When a vein has become varicose, and its walls thickened, the valves become incompetent, or useless, and the whole superincumbent weight of the blood tends in the lower extremity, by the force of gravity, to still further increase the mischief.

Signs.—The enlarged veins are seen ramifying under the skin with a more or less tortuous and serpentine course, and often feel thickened. One or more veins may be affected, and the tortuosity may be at parts so marked as to constitute large clusters of dilated vessels, which look bluish under the thinned skin. Occasionally the smaller vessels are mainly implicated, and then great numbers of them may be involved.

The **Effects** of this condition are very varied. The circulation in the lower parts of the leg may be impaired, especially that of the skin. The limbs feel heavy and painful, and after standing or exercise there is usually a little swelling of the ankles. Congestion of the skin often follows, appearing as minute reddish points; these subsequently run together and form brownish patches of pigmentation. Eczema is frequently induced by the irritation of these, as by rough and coarse trousers or dirt, and may result in actual ulceration. Any lesion, such as a scratch or abrasion, instead of healing readily under a scab, tends to spread and form an ulcer. Injury to the vein may lead to thrombosis and spontaneous cure, but coagulation sometimes occurs in the pouches, and the clot may subsequently shrink and form a small fibrinous or calcareous mass, known as a **vein-stone**, or **phlebolith**. Gouty persons with varicose veins are especially prone to attacks of phlebitis. Occasionally the dilated pouch of a varicose vein gives way, and an alarming gush of blood results; the same may occur from the extension of ulceration through the vein wall. The blood under these circumstances is derived not only from the lower but also from the upper end, inasmuch as the valves have become incompetent—that is, do not prevent the blood from flowing away from the heart. A column of blood extending

from the heart to the knee and ankle is thus tapped near its lower end, and, unless prompt precautions are taken, the patient's life may be lost.

The **Treatment** of varicose veins is **palliative** or **radical**.

Palliative Treatment consists in removing any source of obstruction in the shape of tight garters, in limiting the amount of standing, and in the application of either an elastic stocking or an india rubber bandage. The bowels should be kept well open, and the general health attended to. Eczema may be treated by the application of soothing and drying ointments—e. g., benzoated zinc ointment. Varicose ulcers may be treated on ordinary principles, but repair is often delayed till the veins have been dealt with by operation.

Radical Treatment consists in the **excision** of the distended veins. It may not be practicable to remove them entirely, but if the largest and most prominent are taken away, the others tend to shrink and disappear.

Inflamed Varicose Veins are not infrequently met with, and may result in a natural cure of the condition. The symptoms are those of a superficial phlebitis, and the treatment indicated for that condition should be followed out.

Hemorrhage from a Ruptured Vein needs prompt and decisive treatment. The bleeding spot should be pressed on by the finger, and the patient laid on his back with the leg elevated, until either a pad of antiseptic dressing can be applied to the wound, or a handkerchief or bandage secured over it. Where practicable, excision of the vein is the best plan to adopt, tying it above and below.

Nevus ("Birthmark").

A **nevus** is a vascular tumor commencing in the skin or subcutaneous tissues, and consists of a cluster of vessels held together by a certain amount of connective tissue. They are usually of congenital origin, or develop soon after birth. Left to themselves, they may shrink and disappear, but more often they tend to increase in size more or less rapidly. Two main varieties are described:

The **Capillary Nevus** (or **mother's mark**), occurs in the form of a slightly raised flattened mass, **bright red** or **purple** in color. As a rule, they are quite small, not exceeding an inch or two in diameter, but sometimes they extend widely over the face and neck, and are then very superficial in character, and somewhat dusky in color, constituting the "port-wine stain."

Treatment must be in the hands of a doctor and is fairly simple and successful.

The **Cavernous or Venous Nevus** most commonly involves both skin and subcutaneous tissues, but is occasionally purely subcutaneous. It consists of a more or less prominent swelling, soft to the touch, and easily compressible, but refilling when the pressure is removed. There is no pulsation, and the mass may be lobulated. If subcutaneous, the skin over it is somewhat bluish in color, but the mixed forms are dusky red.

The **Treatment** is by no means as simple as in the former varieties. The following plans are recommended:

1. **Excision** of the growth should always be adopted where practicable.

2. **Strangulation** of nevi with ligatures was largely used in the old days, and is even now practiced by some surgeons; but it is bad and has not a redeeming feature.

3. In cases where excision is unadvisable and the circulation can be temporarily controlled, the **Injection** of coagulating and irritating fluids may be made use of.

4. In cases where the circulation cannot be completely arrested, or where excision is impossible, or where it is important to leave no scars or only minute ones, **Electrolysis** may be employed with advantage. It consists in the passage of a strong electric current through the mass, producing chemical and physical changes in the contained blood.

Venesection (Bleeding).

Venesection, or **phlebotomy**, is a means of treatment which has greatly fallen into disuse of late years, but is still occasionally employed with benefit. When a patient is becoming cyanosed, and asphyxia is threatening either (a) as a result of pulmonary engorgement owing to the heart being unable to drive the blood into the systemic circulation, or (b) as a consequence of some accident involving the chest wall and lungs, whereby the blood-aërating surface is so diminished that it cannot deal with the blood reaching it through the right side of the heart, which hence becomes enormously distended and threatens to stop in a condition of overdistension; or (c) where inflammation of the brain is pending, and the pulse is hard and full; or (d) in many inflammatory states in strong, full-blooded individuals—in any of these conditions venesection may be used with advantage.

The vein at the bend of the elbow is that usually opened.

INSTRUCTION TEN—*Lymphatic Glands*

How the Lymphatic Glands Extract Poisonous or Infectious Germs.

Nature Filters Through the Glands and Eliminates Many Sources
of Disease.

INFLAMMATION OF LYMPHATIC GLANDS.

Subject Reference

*For Tumors of
Lymphatic Origin,
see page 63.*

*For Suppura-
tion, page 4; also
page 16.*

Inflammation of Lymphatic Glands.—The cause of this condition is almost always the absorption of some irritative material (poisonous or infective, i. e., containing germs) from the skin, or a wound, or abscess at a more distant part. When a part becomes inflamed there is always an increased flow through the lymph channels, owing to the exudation; the result of this is an increase in size of the glands to which the lymph is carried, which quickly disappears when the inflammatory process is at an end. If, however, irritating toxines (or poisons) are produced in the inflamed area, they give rise to a more prolonged and serious affection. When pus-forming organisms are also absorbed, suppuration almost invariably results. In fact, the lymphatic glands must be looked on as the **filters** by means of which Nature eliminates many sources of disease.

Occasionally acute lymphadenitis (as inflammation of lymph glands is termed) arises without any obvious injury, being attributed in such cases to strain, as from over-walking; possibly some unnoticed skin-injury is the cause, but in other cases it seems probable that the swelling of the glands is really due to a strain, which may have induced some interference with the flow of lymph. It does not necessarily result in suppuration.

The **signs** and **symptoms** of a localized inflammation are present. The glands can be felt as enlarged, tender, and rounded masses, the skin over them being red and swollen; and the swelling, which is at first hard and brawny, becomes soft and fluctuating when pus has formed. Fever, malaise (general wretched feeling), and all the symptoms of an acute inflammation, are usually well marked.

The **treatment** consists, in the first place, in the removal of all sources of irritation, both physical and physiological. The part must be **kept at rest** and protected from injury, and the offending wound dealt with by such antiseptic measures as may be needed to ensure its restoration to a healthy state as quickly as possible. Hot fomentations are applied to the gland, and the patient, after the administration of a purge, may be given quinine and iron, if considered necessary. As soon as pus has formed it should be let out, and the wound dressed antiseptically. Linseed-meal poultices, while useful in encouraging

the formation of pus, are most undesirable after the abscess has been opened.

Suppuration in the glands of the **Neck** is exceedingly common, arising most often from affections of the scalp, ear, throat or lips.

Chronic Lymphadenitis.—Two varieties of chronic inflammation of lymphatic glands are common, viz., the **simple** and the **tubercular**.

1. **Chronic simple lymphadenitis** is a condition resulting from some irritation at a more distant part, which is insufficient to cause an acute attack. It also occasionally results from blows and strains, as in over-walking, being in such cases possibly due to obstruction to the lymphatic flow, owing to compression or rupture of the efferent vessels. The glands become enlarged, tender, and painful. This condition often precedes, and, indeed, may be looked on as a predisposing cause of, tubercular lymphadenitis. The **treatment** consists in keeping the part at rest, removing if possible all sources of local irritation, combined perhaps with the local application of iodine. The general health should also be attended to, especially in children predisposed to the development of tubercular disease.

2. **Chronic tubercular lymphadenitis** (also termed **scrofula** or **king's evil**) is an affection very commonly met with, the nature of which is now much more fully understood than formerly, and in the treatment of which great improvements have been made in recent years.

Causes.—It occurs most commonly in children or young adults, especially in those who have an inherited predisposition to the development of tubercular disease. Although it may arise in all classes of the community, it is especially prone to occur among the children of the poor, whose surroundings are unhealthy, and whose general condition is lowered by insufficient or bad food and want of fresh air. Not uncommonly some local center of irritation is present in the form of head lice, chronic running of the ear, or eczema of the face. As a result of this, neighboring glands become chronically inflamed, and "the soil is thereby prepared for the seed." The bacilli are conveyed to the gland by the blood or lymph, gaining access through some break of surface, or perhaps through a healthy mucous membrane. Any lymphoid tissue in the body may be the seat of tubercular disease; but the glands of the neck, especially those under the jaw and in the side of the neck, below the ear, are much more commonly involved than any others. The glands in the armpit and groin are also not unfrequently affected, while tubercular disease of those in the mesentery (which holds the bowel in place) gives rise to the affection known as "tabes mesenterica."

The course of the case may be described under the following headings, although it must be remembered that they do not necessarily follow one another in the order given: (1) The earliest manifestations of the disease consist in a **fleshy enlargement** of the glands, which cannot at first be distinguished from a simple chronic overgrowth. The gland may be enlarged to many times its natural size. (2) **Caseation** (change to cheesy material) of the tubercular tissue follows sooner or later, any part of the gland being affected. (3) **Calcification** (deposit of lime) of the caseous material may occur in those cases which are tending to recovery. This change is most frequently observed in the glands within the thorax and abdomen. (4) More commonly **suppuration** ensues. (5) A certain amount of inflammation about the glands is almost always met with, though not to any great extent in the early stages. (6) Sooner or later the abscess, if left to itself, bursts either at one or several spots, leaving ulcerated openings, through which may be seen granulation tissue mixed with caseating material. The edges are undermined, thin, and purplish. The granulations are sometimes very prominent, and may protrude through the openings as masses like a cauliflower. Pus escapes from these, and this condition may persist for many years if proper treatment is not undertaken.

The **treatment** of tubercular glands is **palliative** or **radical**.

Palliative treatment consists mainly in improving the general health by means of suitable diet and tonics, such as cod-liver oil and syrup of the iodide of iron, together with residence in a healthy, bracing situation, especially at the seaside. All sources of local irritation should be removed so as to exclude pus organisms. Counter-irritants, such as iodine paint, are best avoided. **Rest** of the affected part should be enforced as much as possible; in some cases the application of splints to restrict movement is advisable.

Radical Treatment.—Wherever practicable, glands evidently tubercular should be completely removed by operation. In the neck very extensive operations are nowadays undertaken for the removal of tubercular glands.

Hodgkin's Disease is a condition usually met with in adults, and is characterized by an overgrowth of all, or nearly all, the lymphoid tissue in the body, including glands, the spleen, the solitary or the clustered follicles of the intestines, etc. Where the spleen is mainly enlarged, the disease is often termed "splenic leucocythemia," owing to the fact that in it blood changes are present—there is a marked increase in the number of leucocytes, while the red corpuscles are de-

ficient both in number and in the amount of hæmoglobin contained in them. When, however, the external lymphatics are mainly affected and the spleen not specially so, it is termed "Hodgkin's disease." In it the patient is profoundly anæmic (thin or poor blooded).

The tumors thus produced grow slowly, are painless, and, when groups of glands are affected, adhere together, forming masses, but with no tendency to caseate or suppurate. The skin becomes involved in the tumor later on, and superficial ulceration may follow, but there is no subsequent protrusion of the growth.

The prognosis is exceedingly grave, the disease usually progressing in spite of all treatment to a fatal issue, which is due to exhaustion.

Treatment.—Arsenic combined with iron may be administered, and, latterly, injection of an emulsion of bone-marrow has been strongly recommended, but the results gained hitherto have not been at all satisfactory. It is useless attempting to remove the external growths, since they are only an evidence of a deep-seated general affection.

Growths in lymphatic glands, due to the lodgment in them of the "seeds" of the disease, are a special feature of all cancerous tumors. In the sarcomata they are less common, but are always present in some kinds of tumor.

INSTRUCTION ELEVEN—*Affections of Nerves*

Subject Reference

*For Diseases of
Nervous System,
see pages 427-456.*

How the Nerves Become Bruised, Strained, Ruptured or Compressed NEURALGIA, SCIATICA, ETC.

Injuries of Nerves.

The simplest and most common form of injury to which a nerve is liable is a **contusion** or **bruise**, causing a sensation of tingling or "pins and needles," which usually wears off in the course of a few hours. In severe cases variable degrees of loss of power and sensation may ensue, and in hysterical women more or less neuralgia. In patients suffering from gout, syphilis, or rheumatism, a chronic nerve-inflammation is readily induced, often of a somewhat intractable type, and this even occurs in healthy individuals. As a rule, all the treatment needed consists in gentle friction with stimulating liniments.

A nerve may also be **strained** by any sudden, unexpected or excep-

tional movement, producing effects identical with those arising from contusions.

Rupture of nerves without an external wound only occurs in connection with severe injuries, such as dislocations or fractures.

Compression of a nerve is usually due to the growth of tumors or aneurisms, or to some displacement of bones, as in fracture or dis-

Fig. 261.

"Wrist-drop" due to injury or poisoning of the nerve to the muscles that extend the wrist. Occurs in lead poisoning, *e. g.*, in painters.



locations; or it may be due to the use of a crutch, which presses on nerves in the armpit. The early symptoms in such cases are those of irritation, *e. g.*, **cramp** and **spasm** of muscles, or neuralgic pain; while the later ones, due to more prolonged compression, are those of **paralysis** and **anæsthesia** (loss of feeling). If the compressing cause can be removed, recovery, at any rate of a partial character, follows in time under suitable treatment, such as massage, electricity, and the administration of nerve tonics.

Total Division of a Nerve.—Nerves are not uncommonly cut completely across in open wounds.

The **immediate effects** are: (a) Total paralysis of the muscles supplied by the nerve; (b) complete anæsthesia of the parts supplied by it, which, however, is not necessarily permanent; (c) paralysis of the walls of the blood vessels is also produced, resulting in the limb becoming reddened and warmer for a few days, and then subsequently colder and insufficiently supplied with blood.

1. **Changes in the Muscles.**—Complete paralysis of motion necessarily occurs when a motor nerve has been divided, and the muscles involved slowly waste.

2. Various changes of **sensation** may be met with, in the shape of neuralgia, over-acute sensation, loss of sensation, etc.

3. The blood supply to a paralyzed part is always diminished, although congestion may result in the lower extremities, owing to weak circulation; consequently the temperature falls, and the vitality of the part is decreased.

Regeneration of a divided nerve may ensue and restoration of function be obtained. The earliest evidence of regeneration is a

slight return of sensation, which may be at first abnormal, and only slowly becomes of a normal type. Motion is generally much later in its restoration than sensation, and may never be entirely recovered.

The **treatment** of a divided nerve is in the hands of the surgeon.

During the time that the paralysis continues the limb itself must be well massaged, the fingers or toes worked daily to keep them from getting stiff, and the muscles treated with electricity to prevent them from degenerating too rapidly.

Neuralgia.

Neuralgia is a condition which is exceedingly common, and may be one of the most terrible afflictions to which the human frame is subject. It is characterized by a paroxysmal or intermittent pain of a darting or stabbing character, which follows the course of some particular nerve or nerves, especially the nerve of sensation of the face and teeth. The attack commences suddenly, and the pain steadily increases, until it reaches a climax, and then gradually or suddenly subsides. These paroxysms may last minutes or hours, and may recur at varying intervals, either a few in a day, or many in an hour; they may be induced by natural conditions, or physical phenomena, such as sudden noises, a draught of air, etc. Moreover, pressure over the affected trunks may originate, relieve, or increase the pain, while the skin affected by them is often intensely tender, and even reddened and puffed. Occasionally adjacent muscles may become spasmodically and sympathetically contracted during the attack, while excessive secretion, such as tears or sweat, is also induced. Herpes (which is a skin eruption) is sometimes met with in the area supplied by the affected nerve (e. g., shingles in connection with intercostal neuralgia).

The **causes** of neuralgia are very diverse. Thus, as **predisposing** causes may be mentioned the hysterical temperament, anæmia, and depressing circumstances of all kinds, especially mental anxiety and worry. The **direct** causes may be toxic, e. g., malaria, lead, or mercury; reflex, e. g., ovarian disease, worms, etc.; central, from disease of the spinal cord or brain; from pressure on the roots of the nerves as they emerge from the spinal canal or cranium; or peripheral, owing to disorders of the nerve-trunks induced either by injury, inflammation, or new growths (tumors).

Treatment consists in attention to the general health, and the local application of counter-irritants and sedatives.

When, however, medicinal agents fail, surgical measures are necessary to allay the patient's sufferings.

The Fifth or Trigeminal Nerve.—The disease known as **trigeminal neuralgia**, **facial neuralgia**, or "**tic douloureux**," is met with most usually in women, though not infrequently in men. It is clearly distinguished from the simpler forms of neuralgia (due to some local irritation or general weakness) by the paroxysmal character and violence of the pain. As a rule, it commences in the cheek and side of the nose or in the lower teeth, radiating thence to all the parts supplied by the nerve. The paroxysms are not very frequent at first, but they rapidly increase both in number and severity, until at last the patient becomes utterly prostrate, and may be so depressed as to contemplate or even attempt suicide. The condition often depends a good deal on the general health, and intermissions of varying length occur. The attacks are accompanied by twitching of the muscles of the face, and even of the neck; also by sweating and reddening of one side of the head, and the development of such marked "tender points" that possibly the patients cannot brush their hair or wash their face on the affected side, which becomes dirty and often shiny. Excessive flow of tears is a marked feature during the attacks, and there may be a considerable increase in the saliva, as also of discharge from the nose.

In the **treatment** innumerable remedies have been used, with a varying amount of success or failure, e. g., quinine, where there is a malarial history; iodides and mercury for syphilis; iron and arsenic for anæmic patients. All sources of reflex irritation should be removed or treated, such as decayed teeth, defective eyes, nose trouble, ovaritis, etc. If the pain persists, **operative measures** will, sooner or later, be called for.

Sciatica, or neuralgia of the great sciatic nerve, is a most painful affection, and often exceedingly hard to cure. It may arise from a great variety of **causes**: (a) Inflammation of the nerve-sheath, the result of cold, injury, gout, rheumatism, syphilis, and many toxic agents; (b) pressure upon the nerve, as by aneurisms, tumors, or old-standing dislocations of the head of the femur; (c) similar pressure upon the nerve in the pelvis, or as it emerges, as from rectal or uterine cancer, a pregnant uterus, or uterine tumor; (d) pressure upon the nerve-roots in the spinal canal, as from caries or sarcoma; (e) chronic diseases of the spinal cord, such as tabes.

The **symptoms** are very evident, the pain shooting down the back of the thigh and often to the toes. It is of a paroxysmal nature, and may be brought on by pressure over almost any part of the nerve or

by movements of the thigh, and hence the patient's gait is stiff and shambling. Tenderness in the line of the nerve may be felt when the cause is inflammation of the nerve, and the trunk may sometimes be felt as a thickened cord. The limb is usually kept slightly flexed, but complete flexion at the hip-joint is an impossibility; and if, when the patient is standing against a wall, the limb can be bent to a right angle with the knee extended, it is certain that sciatica is not present.

The **treatment** necessarily varies with the cause. If due to inflammation of the nerve, general anti-syphilitic or anti-rheumatic remedies may be adopted, and blisters or sedative remedies in the more acute cases applied to the back of the thigh. Hypodermic injections of morphia and atropine may also be useful; but if all the usual remedies have been exhausted without benefit, stretching of the nerve (by a doctor) may be employed.

Subject Reference

For Bandages, and their Application, see Vol. 1, pages 404-428.

For Sprains, Dislocations and Fractures, see Vol. 1, pages 448-452.

INSTRUCTION TWELVE—*Injuries of Bones*

Broken or Injured Bones

BROKEN NOSE, FRACTURE OF JAW, BROKEN COLLAR BONE, Ribs, Arm, Thigh, Knee Cap, Leg, Ankle, Foot, Etc.

Contusion or Bruising of a Bone and of its periosteum (or covering) is, as a rule, a matter of no great moment, although the part becomes painful, swollen, and bruised. Occasionally, in people who are thoroughly out of health, and with low germicidal power, infection of the bruise may occur, causing inflammation and even necrosis of the part. The **treatment** of an uncomplicated case consists merely in the application of a bandage and cooling lotion, while if periosteal thickening result, iodide of potassium may be needed, and iodine paint locally.

Bending of bone may be with or without fracture. Bending without fracture occurs mainly in children, and in adults is only the result of some local disease. More commonly a partial fracture is present, constituting the condition known as "green-stick" fracture. The deformity can generally be remedied by the application of a little force.

Special Fractures.

Broken Nose.—The bones of the nose are broken only as a result of direct violence, by the fist, a **base ball, club**, etc. The fracture is generally transverse, and situated just above the free margin

of the bones; occasionally, when greater force is used, they give way close to the root of the nose, and may then be complicated with fracture of the frontal bone or base of the skull. There is usually a good deal of deformity from depression or lateral displacement of the fragments, although it may at first be masked by the amount of bruising present. The fracture very readily becomes consolidated, and the deformity is thus often irremediably fixed. It is most important, therefore, to determine the presence or not of a fracture at once, and this can only be made out when much swelling is present by grasping the nose and moving it from side to side to find out if there is any grating. The **septum** is sometimes broken and depressed in association with the above injury, but it may occur alone in other instances, giving rise to lateral displacement. This need not result in obvious deformity, but may lead to considerable obstruction and discomfort in the nose. The **treatment** of these cases

Fig. 262.
Fracture of the jaw, treated
by a four-tailed bandage.



consists in immediate replacement of the bones, preferably under an anæsthetic; this may be done by the pressure of a slender object slipped inside the nose. In old-standing cases, where there is much depression of the bridge, but little can be done, although an operation may help very much.

The **inferior maxilla** or **jaw** is usually fractured by a direct blow, but occasionally by force applied indirectly, as when a carriage passes over the bone, laterally compressing the two sides, and leading to a fracture in the middle line. Most often the site of the lesion is a little in front of the double teeth.

The **treatment** of a fractured jaw is frequently a matter of difficulty, owing partly to the septic element present, and partly to the difficulty of fixing the jaw without interfering with the patient's nutrition. A great variety of methods have been therefore suggested. The following points are important: The mouth must be

well washed out often, with an antiseptic solution. The jaw must be supported by a bandage, a mould, or by wiring the pieces of bone together. The patient must not talk nor try to use his jaw in any way for 3 to 5 weeks. He must have fluid food.

Fracture of the ribs occurs in two distinct ways: (1) By direct violence, as by blows or stabs, the fragments being driven inwards, and damage to the underlying pleura, lungs, liver, or diaphragm, being very likely to occur; or (2) by indirect violence from external pressure, as when the chest is compressed between a cart-wheel and the ground, or between a wall and the end of a wagon. The two ends of the rib are then brought so close together that it breaks at the bend, well around on the back, at the limits of natural elasticity, and it gives way at the most convex part—i. e., near the angle. One or several ribs may be broken, but the displacement is rarely marked, except in cases due to direct violence where several ribs have been “staved in.”

The **symptoms** are usually tolerably clear, viz., a sensation of something snapping or giving way, a sharp, catching pain at the site of the injury, increased on deep breathing and coughing, and possibly some swelling and discoloration. The fracture may be evident on palpation, or crepitus detected when the patient coughs or on applying the ear to the side of the chest. When several ribs are driven in, a marked depression may result, while if the bone is well covered with fat or muscle the diagnosis may be extremely obscure.

The **treatment** is simple. The affected side is to be securely strapped with broad strips of adhesive plaster, so as to limit the movements as much as possible. The strips, $1\frac{1}{2}$ to 2 inches wide, should project beyond the middle line, both front and back, and are applied from below upwards while the chest is in a state of forcible expiration, each strip overlapping the preceding one. A firm woolen bandage should then be applied over all. If the ends of the bone are driven inwards, such strapping can rarely be borne, as it tends still further to irritate or compress the lung. Under such circumstances all constriction of the chest should be avoided, but the patient should be confined to bed with a sandbag between the shoulders, and the arm bound to the side. When the lower ribs are broken, tight applications are generally to be avoided, since the diaphragm is likely to be irritated, and troublesome hiccough may result. Ribs, as a rule, unite readily, but a considerable amount of callus (the lump at the fracture) is formed owing to the difficulty of satisfactorily fixing the broken ends.

Fracture of the Collarbone or Clavicle.—No bone in the body, except the radius, is broken more frequently than the clavicle; this is due to its exposed position and its brace-like action in keeping out the point of the shoulder, so that every shock to the arm is transmitted through it to the trunk. Hence, it is more usually broken as the result of force directed to the hand or shoulder, such as a fall from a horse. The injury is very common in children, being often of a “greenstick” nature, and more frequent in men than in women.

Fig. 263.

How to put up a broken collar bone, using strips of adhesive plaster. One strip holds the arm back and passes around the body. The other draws the elbow forward and holds the forearm up and across the chest. Thus the whole shoulder is pulled outward and the broken clavicle held in place.



Symptoms.—There is a history of an accident in which the patient has fallen on his hand, elbow or shoulder, or been struck on the collarbone. The break can be felt on examination with the fingers, because the collarbone is just under the skin and easily felt. There is pain on pressure or on moving the shoulder. The patient may hold his head over towards the injured side, and support the arm with the opposite hand placed under the elbow. Often one can see the deformity of the bone.

Treatment.—If there is little deformity all that is needed is to fix the arm in a sling and to keep the patient quiet. If the shoulder drops forward a figure-eight bandage is required around the shoulders to keep the outer fragment back, and an elbow sling to keep it up.

Fracture of the Arm (Humerus).

Fracture of the humerus may occur at one of several places:

1. At the upper end within the capsule of the joint.

2. Near the upper end, where the bone is slender, at what is termed the "surgical neck," because this bone is most often broken here.

3. Near the middle.

4. Near or through the lower end.

The cause is generally a fall or a blow. The symptoms vary according to the seat of the fracture. There is always pain, swelling, deformity and loss of power of some of the movements of the arm. The patient should be stripped and the two shoulders and



Fig. 264.
A *green-stick* fracture of the radius, a common fracture in children.

arms compared. The adjacent parts must also be examined, as they may be injured too. Thus the clavicle, ribs, and forearm should be examined carefully when the arm has been broken.

Measuring from the point of the shoulder to the bony point at

Fig. 265.

A healed fracture of the thigh bone. The enlargement is termed a "callus," and the bone is stronger where it was broken than before.



the side of the elbow and comparing this distance with that on the sound side will show any shortening. Crepitus or grating will distinguish fracture from dislocation.

The treatment consists in the use of splints, pads in the armpit,



Fig. 266.

"Colles' fracture," in which the lower end of the radius is broken, usually by a fall on the outstretched hand. As seen from the side.



Fig. 267.

The same seen from in front. The dotted line indicates the displacement owing to the fracture. The hand can not be turned over while the elbow is bent.

if necessary, and bandages to keep the parts in their proper place until healing has been completed, usually in about six weeks. In some cases massage is necessary in the course of healing; even as early as the third day it is permissible. If a doctor can be had, it is well to have the arm properly set and to get directions for the subsequent treatment.

Fracture of the Radius.

The lower end of the radius is broken with extreme frequency, constituting what is known as **Colles' fracture**. This injury occurs most commonly in women of advanced years, although it may happen at any age or to either sex. It is almost invariably due to falls upon the outstretched palm, when the hand is completely turned away from the person's face and extended. The line of fracture is about 1 inch from the wrist, though rather under than over this.

Fractures of the Upper End of the Thighbone or Femur.

Fractures of the neck of the femur are commonly divided into intra and extra capsular varieties (that is, fracture (1) within, or (2) below the capsule of the joint).

Fig. 268.

"Impacted" fracture of the neck of the thigh bone. A common fracture in old people. Occurs in a fall on the hip. The limb is shortened. There is no grating, as the upper fragment is driven into the lower. It must not be disturbed by handling or careless examination.



The **intracapsular fracture** is met with in persons in advanced life, and especially in females, only about 1 per cent of the cases occurring in individuals under fifty. As a rule, the accident is due to some slight stumble or fall, such as slipping off the curb or tripping upstairs; the bone yields in consequence, and the patient falls to the ground.

It is not always easy to know whether the neck of the thighbone is broken or not. If unimpacted the fracture is easily known by the complete loss of power over the leg, and by the crepitus or grating. When impacted the fracture may not prevent the patient from moving the leg. But there is pain, the leg is rolled outward and shortened. If there is only bruising of the hip and no fracture has occurred, there will be no shortening and no crepitus, and the bony points will have the same positions as those on the sound side, as determined by comparison. In dislocation of the hip the head of the bone is felt in the wrong place.

It must not be forgotten that, after an intracapsular fracture (which may occur as the person stumbles) the patient may fall, not on the injured side, but on the sound thigh, and cases have been known where all the attention of the surgeon was being directed to the wrong limb, owing to the amount of bruising there manifested.

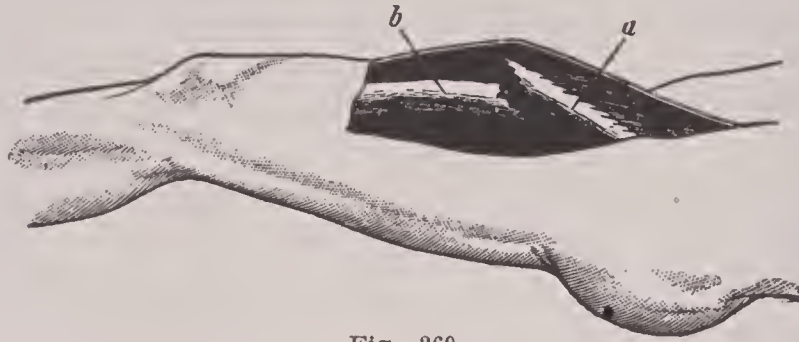


Fig. 269.

Fracture of the thigh-bone at its middle. a. Upper, and b. lower "fragment." The muscles pull the fragments out of line.

Fractures of the shaft of the femur are extremely common accidents (in spite of the apparent strength of the bone), on account of its exposed position. Any part may be involved, particularly the center, while they occur at the lower end more frequently than at the upper. In the latter situation they are usually due to indirect violence, while at the lower end they generally result from direct

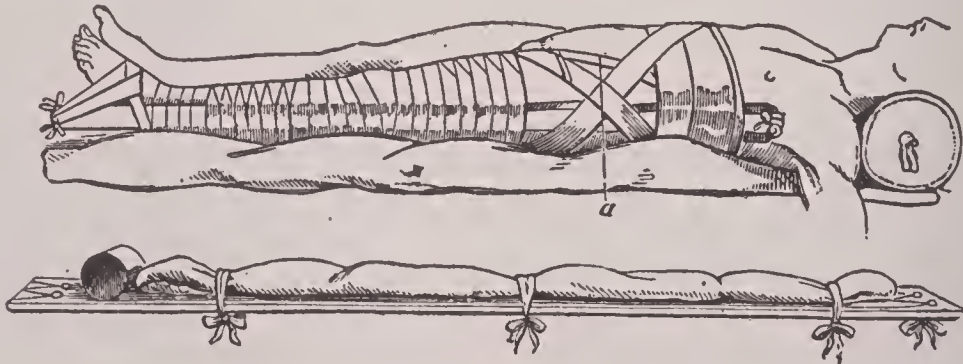


Fig. 270.

A long splint (Liston's) to treat fracture of the thigh-bone. a. Perineal band from the top of the splint around through between the legs, to draw the splint down.

injury; either form of violence may lead to a fracture at the center. Muscular action is also responsible for a certain number of cases. Every form of fracture may be met with, the direction and character necessarily varying with the cause of the accident.

In almost every case **displacement** occurs, the direction and amount of which depends not only on the line of fracture, but also on the situation.

Treatment.—Many more or less complicated plans of treatment

have been practiced; but simple measures are equally good. The patient must be kept in bed and the broken bone is to be brought to its natural length and shape and kept so by splints and bandages. It may be necessary to have a weight or a rope over a pulley to keep the leg of a right length.

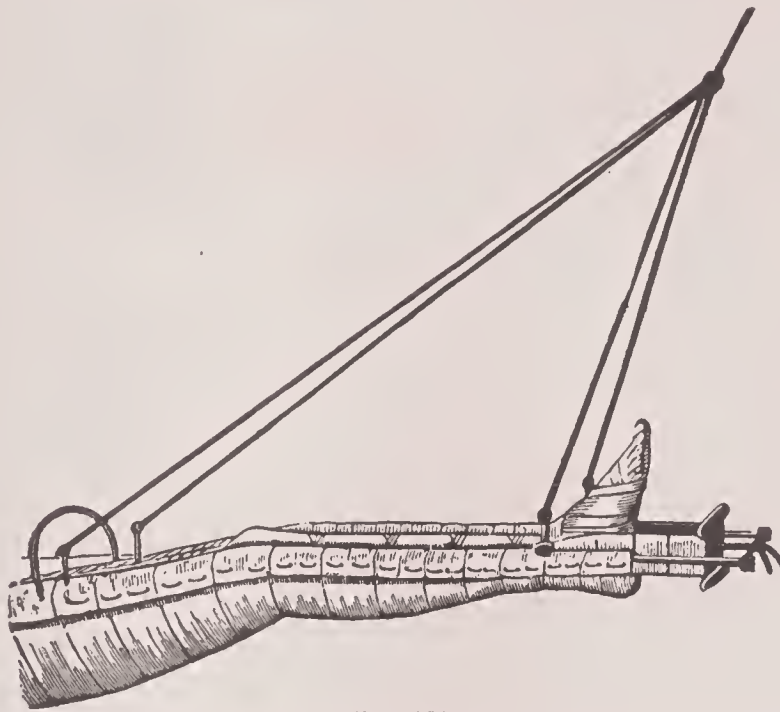


Fig. 271.

A "Hodgen's splint" to treat fracture of the upper end or neck of the femur. Below the foot is a device to pull on the limb. The small rope above passes over a pulley to a weight and the leg is thus held steady.

Fractures of the Knee-cap.

The patella may be broken (1) by muscular force and (2) by direct violence, and the conditions produced are quite different.

1. **Fractures by direct violence** may divide the bone in any direction, but are most often vertical or star-shaped, and possibly comminuted (breaking the bone into several pieces). They are frequently incomplete, i. e., mere fissures of the front of the bone, and as a rule the fibrous capsule covering it is uninjured, thereby preventing any displacement of fragments. There is a good deal of subcutaneous bruising, and perhaps some fluid gathers in the joint. Crepitus can be obtained if the fracture is complete. **Treatment** consists in the application of a back-splint, and rest, with perhaps evaporating lotions. Passive movements must be commenced early where there has been much effusion into the joint.

2. **Fractures due to muscular force** constitute a very different class of injury, since they are always transverse, usually complete,

and also involve the fibrous capsule, so that considerable displacement occurs.

When the knee is partly bent, the patella is most prominent, resting upon the lower end of the thighbone; in such a position any sud-

Fig. 272.

Fracture of the patella or knee-cap. One fragment is pulled up by the muscles, the other is attached to the tibia (or shin bone) by the ligament of the patella.



den and violent contraction of the powerful muscles on the front of the thigh (which are attached to the patella and straighten the knee) can take it at a disadvantage, and may succeed in snapping it. A sudden attempt to recover one's balance after having slipped is the



Fig. 273.

A knee with a fractured patella (knee-cap). One-half of the broken bone has been drawn up by the muscles in the front of the thigh, and forms a hard lump just above the knee. The latter is much weakened.

usual way in which this accident is produced. Possibly in some people there may be some predisposing weakness of the bone, as cases are not rare in which the other knee cap is subsequently broken although the first has healed and is as strong as ever.

The **signs** of this fracture are very evident, consisting of almost complete loss of power in the limb, and pain, distension of the joint with blood, and separation of the fragments, which can be readily detected and sometimes pushed together, with crepitus. This displacement, at first due to muscular action, is maintained by the effusion of blood and fluid in the joint. Union by bone is rarely

obtained under ordinary circumstances, a fact explained partly by the separation of the fragments, and partly arising from the fibrous capsule yielding at a different level to the bone, the loose end being carried in and caught between the two pieces of bone. Fibrous union is the usual result, and when this is short and strong, it may be exceedingly satisfactory; but more commonly the bond of union yields when the limb is used, so that the two fragments are once again separated, and merely bridged over by a fibrous band, the joint being often weak and more or less powerless in consequence.

Fractures of the Leg.

In the lower leg fractures may be due to direct or indirect violence, and may involve either the tibia or fibula alone, or both bones.

Fractures of the Tibia Alone.—Several varieties occur. (a) The **upper end** is usually broken as a result of direct violence, the line of fracture being transverse; it is by no means a common accident. The characteristic features are not always very evident at first, since considerable swelling is produced. **Treatment** consists in placing the limb upon a back-splint. As a rule satisfactory union ensues, though possibly with some distortion. (b) Fracture of the **shaft** of the tibia, apart from the fibula, is usually caused by direct violence. It is transverse in the upper part of the bone, and oblique below. The fracture is diagnosed by feeling an inequality on running the fingers along the shin, together with pain at this spot on firmly grasping the bones above and below. There is often but little displacement, since the fibula acts as a splint. The **treatment** consists in the application of back or side splints for a few days until the swelling has gone down, and then the limb may be put up in plaster. If the bones have been comminuted, treatment will be more protracted.

Fractures of the fibula alone are by no means uncommon, usually occurring as a result of direct violence. There is no displacement or deformity, but the patient complains of pain localized to some particular spot, and this can be usually elicited by grasping the bones above and below, and compressing them laterally ("springing" the fibula). Sometimes the diagnosis is extremely uncertain, and then the X-rays may prove useful. **Treatment** consists in immobilizing the limb in a plaster case.

Fracture of both tibia and fibula is a very common accident, due to both direct and indirect violence. The ordinary characteristics of a fracture are very evident, and but little difficulty can ever be

experienced in making a diagnosis. The fracture is likely to become compound when due to indirect violence, owing to the sharp end of the oblique fragment of the tibia, usually the upper, penetrating the skin.



Fig. 274.
Compound fracture of the leg.
The end of the broken bone has
cut through the skin.

Treatment.—Reduction is accomplished by flexing and fixing the knee, so as to relax the muscles of the calf, and then making traction (that is, pulling) on the foot and manipulating the parts into position. It will usually suffice to put up the limb in a pair of side-splints, the longer one with the foot-piece being of course placed on the outer side. In other cases it may be better to apply a broad posterior splint with a rectangular foot-piece and two lateral splints. Union will be sufficiently advanced in two or three weeks to allow of the limb being put up in a plaster casing, which must, however, be retained for at least another month, and even then a good deal of lameness is likely to persist, which will need subsequent massage.

Fractures in the neighborhood of the ankle-joint, and involving that structure, are of considerable importance. They are usually produced by indirect violence, the patient's foot slipping, and leading to lateral displacement of the ankle, the fracture being a secondary result.

Displacement of the foot outward is by far the most common variety, constituting what is known as **Potts' fracture**. It usually results from the patient slipping on the inside of the foot, as from off a curbstone. The **treatment** consists in fixing the foot and leg on a padded splint with bandages to hold the parts in place.

INSTRUCTION THIRTEEN—*Injuries of Joints*

Strains, Sprains and Dislocations of Joints

Certain Conditions if Neglected May Originate Infection.

Subject Reference.

For Bandages, see Vol. 1, page 404, also see 448-452.

For Inflammation of Wounds, see Vol. 2, page 34.

Surgical Wounds, Vol. 2, page 71. Sprain of the Spine, Vol. 2, page 123.

Sprains and Strains.—When, by sudden violence, some of the ligamentous fibers around a joint are ruptured or stretched, the joint is said to be sprained or strained. The accident itself is associated with pain of a most severe character, and is followed by more or less hemorrhage into the surrounding tissues, or into the joint cavity. An attack of synovitis, varying in severity, generally ensues, and may lead to persistent weakness and pain in the joint, either as the result of the formation of adhesions, or owing to the imperfect repair of the ligaments. If the condition thus induced is neglected, it may originate tubercular disease in those who are so predisposed. If the patient is in a bad state of health at the time of the injury, it is possible that an attack of acute infective arthritis may be lighted up.

Treatment.—The joint should be firmly supported by a bandage as soon after the accident as possible, and cold or evaporating lotions applied. In the slighter cases, all that is needed is to strap the joint or use elastic pressure, the patient being allowed to use the limb at the end of a day or two; but in severe sprains it is better to keep the part absolutely at rest for some days, for neglect in the early stages may give rise to as much, if not more, trouble than if the limb had been fractured. Friction with stimulating liniments, massage, and douching the joint alternately with hot and cold water, are subsequently useful in restoring the joint to a complete recovery. When synovitis comes on, the treatment suitable for that condition must be adopted.

Penetrating wounds of joints are often accompanied by an escape of synovia, which is recognized as a glairy, oily fluid, floating perhaps on the surface of the blood; if, however, the hole is small, this may not occur. It is always followed by a certain amount of inflammation, the severity and extent of which depend on whether the wound is infected and on the character of the infection. If no infection has taken place, and the joint is kept aseptic, a simple synovitis ensues, and soon passes off; if, however, micro-organisms have entered, acute septic arthritis will probably supervene, leading to

destruction and disintegration of the joint. A penetrating wound, even if untreated, does not necessarily become septic; thus, if the lesion is produced by a small clean instrument, and especially if this is inserted in a slanting direction, or if the incision is a large one, allowing free vent to all discharges, recovery without septic inflammation is possible.

The external skin should be thoroughly purified, and an antiseptic dressing applied. A careful watch must be kept upon the condition of the joint, and upon the temperature of the patient; as soon as any signs of septic arthritis manifest themselves an operation is necessary.

Dislocations.

The term "dislocation" or "out of joint" is most commonly applied to a forcible displacement of one of the bones in a joint, as the result of an injury. It must not be forgotten that **congenital** and **pathological** displacements also exist.

Congenital Dislocation.—This term is applied generally to any defect of a joint present at birth. The condition is almost always due to a faulty development, as a result of which a normal location of the bones has never been present: hence a dislocation cannot have taken place, and the condition is more correctly termed a mislocation. The hip-joint is that most frequently affected; but similar malformations have occurred in the shoulder, wrist, and jaw, while the patella may be congenitally absent or displaced.

Congenital dislocation of the hip is by no means rare, and is usually due to a defective development of the acetabulum, or joint-socket, which, instead of being hollowed out and cup-shaped, is shallow and flattened. The head of the bone, having therefore no opposing surface to rest against, is misshapen, and travels up over the hip bone and a false joint develops. The condition often passes unnoticed until the child begins to walk, and then the characteristic signs become evident. It is frequently double, more rarely single; i. e., on one side only. The limb is shortened and the hip-joint is bent. The patient has therefore to bend the backbone back in the small of the back in order to get the body upright. The patient's gait is of a curious waddling character, which becomes very marked if only one side is affected. The head of the bone is kept in position only by its ligamentous and muscular attachments. Any injury of the limb is likely to be followed by a synovitis, which in these patients is frequently seen.

Treatment can be managed only by a good doctor.

An operation devised by Lorenz is the so-called "bloodless operation" for congenital hip dislocation. It requires great strength and skill on the part of the surgeon. The structures which hold the bone in its wrong position are stretched or torn across until the head of



Fig. 275.



Fig. 276.

Congenital dislocation of the hip joints. Is present at birth and may be on one or on both sides. Can be successfully treated by a skilled surgeon even after the child is grown up, but the earlier the easier.

the bone can be put in its right place. A plaster of Paris bandage is then put on and the child is allowed to walk. In a few weeks the plaster may be removed and the joint will have formed a good socket meanwhile. No incision is made in this operation. It may be done up to 12 years of age.

Pathological dislocations are produced as the result of some joint diseases, e. g., tubercular disease.

Dislocations Due to Violence.

Causes.—These are predisposing or exciting. Under the former head may be included some anatomical peculiarity of the joint, such

as the shallow socket of the shoulder cavity, or some weakness of the muscles or ligaments which control the movements of the joint. Dislocations are exceedingly rare in children, owing to the fact that any violence directed to a joint or its neighborhood is likely to lead to a separation of the end of the bone from the shaft. Moreover, in old people the bones become brittle, and thus fractures, rather than dislocations, are produced; hence the latter are almost limited to adults, and, owing to their greater exposure to injury, occur in men rather than in women.

The **exciting causes** are the application of external violence and muscular action, acting alone or in combination. The former may be direct or indirect, but much more commonly the latter, the force being applied at some distance from the joint, and driving the bone out of its socket. Muscular action by itself can only produce dislocation in certain joints, which by their peculiar conformation are predisposed to it; the patella and lower jaw are the bones most often affected in this way. If, however, the ligaments of a joint have been stretched by previous disease or displacement, recurrent dislocations are apt to be caused by muscular action.

In **complete dislocation** the articular surfaces of the bones are completely separated from one another. An **incomplete dislocation** is one in which the surfaces are only partially separated.

A **compound dislocation** is one in which the skin has been ruptured and a communication established with the external air. A **complicated dislocation** is one in which there has been some associated injury of vessels, nerves, or viscera. The term **fracture-dislocation** is one applied to a condition in which a dislocation is complicated by a fracture of one or both ends of the bones.

The **signs** of a dislocation are as follows: (1) The evidences of a local injury, e. g., pain, bruising, and swelling due to the bruising, tearing and internal bleeding in the flesh about the joint; the amount of this varies in different cases; (2) deformity of the limb due to the end of the displaced bone being in some abnormal position, where it can often be felt and sometimes seen, and (3) unnatural immobility in the affected joint, and hence impaired function in the limb. The degree of this is necessarily variable, but, as a rule, it is very marked; if, however, fracture is also present, passive movements are possible, though associated with pain and crepitus.

The **effects** produced by a dislocation extend to all the structures about the site of injury. The ligaments are partially or completely torn; the bony surfaces are not infrequently fractured, especially in

closely fitting hinge joints, such as the elbow and ankle; the cartilages may be bruised, or portions of them detached, and neighboring muscles and tendons lacerated and displaced; adjacent vessels and nerves are often contused or compressed. Considerable effusion of blood is always present.

When the dislocation is once reduced, Nature soon restores the part by rapid repair, so that in many cases no permanent injury remains, although in some the rent in the capsule does not heal firmly, leaving the joint weak and liable to a recurrence, while contraction of the injured ligaments and muscles may cause some loss of mobility.

If a dislocation is **allowed to remain unreduced**, anatomical changes are sure to follow. The true joint cavity is shallowed and partly filled up by new tissue. The displaced head of the bone becomes adherent to the structures among which it lies, and, as the result of inflammation, either dense fibrous adhesions are formed, or a new false capsule.

Treatment.—The treatment of dislocations consists in the reduction of the displaced head of the bone with as little delay as possible. There are two chief methods of gaining this end, viz., manipulation and extension.

Manipulation is always the best means to employ where practicable, as it causes less injury to the surrounding tissues. It consists in moving the limb in such directions as shall cause the displaced end of bone to retrace the course that it took through the rent in the capsule to its normal position. Ball-and-socket joints, such as the shoulder and hip, are more suited to this method of treatment than are hinge joints. Anesthesia may be needed in difficult cases.

Extension is employed to overcome muscular and other forms of resistance, so as to draw the bone back into its original position. Extension may be made either by grasping with the hands or a firmer grip may be maintained, and greater force used, by applying a bandage or a jack-towel to the limb by means of a clove-hitch. The extension must be made continuously and steadily; no jolting or jerking action is allowable, or considerable mischief may ensue.

Reduction (that is, the return of the bone to its right place), however produced, is usually accompanied by a sudden and distinct snap due to the contraction of muscles, unless the patient is deeply under an anesthetic, and the muscles absolutely relaxed. The limb is subsequently kept at rest for some days, so as to allow the rent in the capsule to heal. Cooling lotions are applied to reduce the swelling,

and at the end of ten days or a fortnight passive movements commenced, together with rubbing and massage of the soft parts.

Compound dislocations are exceedingly serious, inasmuch as not only is the skin lacerated, and the joint exposed to the risk of infection, but also adjacent vessels and nerves are liable to injury. Unless efficient treatment is adopted, suppurative arthritis ensues, leading to stiffening, or, in the case of larger joints, possibly death from pyemia and septic poisoning. The **treatment** consists of those measures necessary for lacerated wounds, together with reduction of the dislocation.

Special Dislocations.

Dislocation of the lower jaw usually results either from muscular action or from a blow on the chin when the mouth is widely open, as in gaping, laughing, or attempting to take a large bite. In some persons the accident happens with the greatest ease, and constantly recurs, owing probably to looseness of the joint.

The displacement may be on one or on both sides, more frequently the latter. The mouth remains widely open, the teeth and the jaws being separated by about an inch. The lower jaw projects unduly forward, and is fixed, saliva dribbling over the lip; speech and swallowing are impaired, the pronunciation of the lip consonants being especially difficult. A hollow can be felt immediately in front of the ear, and in front of this the knob-like part of the jaw can be both seen and felt, being readily recognized by the slight amount of movement still possible.

When the dislocation is on one side only, the symptoms are much less marked. Some amount of movement of the jaw still remains, while the chin is displaced laterally toward the sound side.

Treatment.—The reduction of the bone is easily effected. The patient is seated in a chair; the operator standing in front, guards his thumbs with a towel to avoid being bitten, and introduces them into the mouth, pressing upon the lower back teeth. This pressure is continued in a downward and backward direction until the end of the jaw behind is free, and then the chin is raised by the fingers on either side. The jaw is kept at rest for a few days by means of a four-tailed bandage.

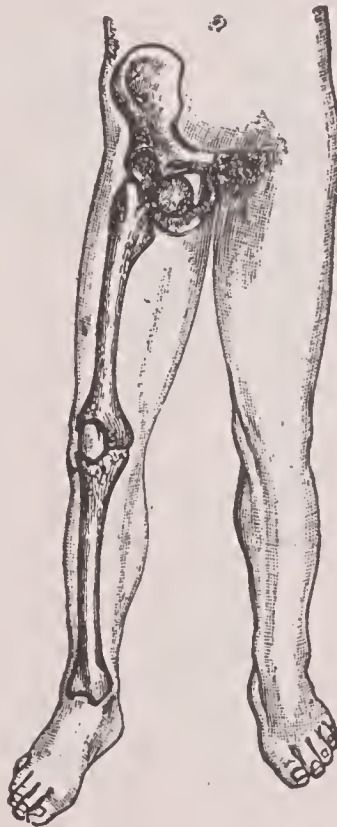
Dislocation of the Inner End of the Collar-Bone.—The treatment consists in pulling the shoulders back whilst you brace with your knee against the backbone. The patient's elbow must be kept forward but not raised. A pad should be placed in the armpit and the

shoulder supported in the way described for fracture of the collar-bone. The dislocation is apt to recur unless the shoulder is thus kept supported for a fortnight until the joint gets strong again.

Dislocation of the shoulder occurs almost as frequently as all the other dislocations of the body put together. The shallowness of the joint cavity, the size of the head of the humerus, the looseness of the capsule of the joint, the extent and force of the movements possible, and the exposed position of the shoulder are the reasons for the great frequency of the accident. It usually results from falls upon the hand or elbow, the arm at the time of the accident being widely outstretched, to enable the individual if possible to save himself.

Fig. 277.

Dislocation of the hip-joint. In this variety the head of the thigh bone is displaced downward and inward; the thigh is seemingly lengthened even as much as 2 inches. The leg is rolled outward a little and bent a little. The hip is flattened somewhat. There is pain in the hip and thigh. The patient may be able to walk, but stoops forward instead of standing erect. He may have fair use of the leg even if the dislocation is not reduced.



The **Signs** of a dislocation of the shoulder are easily made out. (1) The shoulder looks flattened, owing to displacement of the bone inwards, and as a result of this the ridge of the shoulder blade is unduly prominent, and a hollow felt below it, occupied by the deltoid muscle. (2) The head of the bone lies in some abnormal position, and the joint cavity is empty. (3) The elbow is displaced away from the side, and it is impossible to make it touch the chest wall at the same time while the hand is placed on the opposite shoulder. (4) A ruler or straight-edge can be made to touch both the bony point of the shoulder and the outer bony point of the elbow in most cases of

dislocation; this is impossible when the head of the bone is in its normal position, but can also occur in fractures. At the same time, the usual signs of a dislocation already described are also present, viz., rigidity and local bruising.

The **Treatment of Dislocation of the Shoulder** consists in reduction by manipulation or extension; that is, the arm bone (the humerus) is worked into place by pushing, turning and pulling on it in certain ways.

1. For **reduction by manipulation** it is advisable to put the patient under an anesthetic, though not absolutely essential. Chloroform, as a rule, is the best to use, although where the patient is in a bad state



Fig. 278.

Dislocation of the hip forward, inward and upward. The thigh becomes shortened and the knee and toes are turned outward (toward the side). The hip is flattened and the thigh is flexed a little (i. e., the knee is slightly drawn up).

for it, i. e., with his stomach full of food, ether may be preferable. A large number of fatal cases of chloroform administration have been reported as occurring in the treatment of shoulder dislocations; this is due mainly to two causes, viz., the deep anesthesia required, and the want of preparation of the patient. The greatest care must therefore be exercised in giving the anesthetic. Not infrequently, where the muscles are relaxed, any slight rotary movement suffices to "put the bone in."

The surgeon standing in front of his patient (who is seated or lying down) grasps the elbow after bending it, and presses it to the

side. The patient's hand is now carried or forced firmly and steadily outwards until it is at right angles to the body, when distinct resistance will be felt. This causes the head of the humerus to roll out beneath the point of the shoulder-blade, and is often sufficient to put it into joint. If the joint is still out, the elbow should be drawn forwards to the middle of the body line, with the hand still held out to the side, and then the hand is carried towards the opposite shoulder, and the elbow lowered.

Fig. 279.

To reduce forward dislocation of the hip: Put the patient on a mattress on the floor; put him under ether or chloroform if you are a doctor; grasp the ankle and leg and raise the knee as far up towards the body as you can, keeping it turned outward; then swing the knee across the body and bring the leg down straight. After reduction of a dislocation of the hip the patient should be kept in bed some days with the knees bound together to allow time for the torn ligaments to heal; then the joint should be moved passively (i. e., by another person) several times a day for a few days, before the patient moves himself. In some cases the best way to treat this form of dislocation is to prepare the patient as above directed, then bend the knee and the hip each to a right angle, and pull forcibly upward, taking hold behind the knee and placing your bare foot on the point of the patient's hip bone.



Another method varies somewhat in its application, according to whether the head of the bone is displaced forward or backward. For forward displacements the surgeon stands in front of the patient, and grasps the shoulder, using the right hand for the right shoulder and the left for the left, so that the surgeon's thumb rests on the head of the bone, and his fingers grasp and steady the shoulder-blade. With the other hand he seizes the arm near the elbow (which is first to be flexed or bent) and raises it from the side and straightens it. Having thus raised it to a right angle, the arm is steadily and continuously carried in a circle upward and inwards, the thumb pressing on the head of the bone and assisting it to reach the under side of the joint capsule, and thus to enter the socket through the rent. For the backward dislocation, the surgeon stands behind the patient and grasps the shoulder with one hand, raising the arm with the other, and pulling it backwards and twisting it outwards, i. e., the limb is carried in a circle outwards, and finally brought to the side.

2. **Extension** may be made in different ways, the object of all, however, being to overcome the tension or pull of surrounding ligaments and muscles. It may be applied directly downwards by the surgeon grasping and pulling on the arm, whilst his unbooted foot is placed in the axilla, the patient lying flat on a mattress placed on the ground, and the surgeon sitting by the side. Another plan consists in using the knee instead of the heel, the patient sitting in a

chair. Or the arm may be pulled directly upwards, the surgeon's foot having been placed over the point of the shoulder, the patient lying down. The only objection to this last method, which may succeed where other plans fail, is that the blood vessels in the armpit are somewhat exposed to injury. Only when it is impossible to get a doctor should any one else try to set a dislocation.

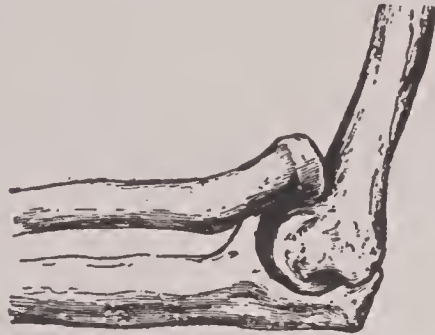


Fig. 280.
Dislocation at the elbow-joint.
The radius is displaced forward
and upward.

Dislocations of the Elbow-Joint are not very uncommon, occurring particularly in children. They are due to either direct or indirect violence. They always result in great swelling of the surrounding tissues, causing their real nature to be obscured, and the diagnosis is hence often difficult. A careful investigation of the relative position of the bony points and of the power of mobility of the different parts on each other, is necessary in order to come to a definite conclusion as to the exact nature of the injury.

The **Treatment** of the above dislocations is carried out along the same lines; it is necessary to unhitch the interlocking bony prominences, so as to allow the bones to return to their normal positions. This is usually accomplished as follows: The patient being in a sitting position, the surgeon presses backwards, with his knee in the bend of the elbow, against the lower end of the humerus; at the same time he pulls on the wrist and manipulates the bones back into place.

Dislocation of the Hip, though not very common, is a condition of extreme gravity. The depth of the socket in which the thigh-bone rests, and the strength of the muscles and ligaments surrounding it, make the accident rare. It is never produced by direct violence, but always results from a force applied to the feet or knees, or, if the legs be fixed, to the back. It is rarely met with except in young people or adults, since after the age of forty-five fractures of the neck of the bone are much more likely to occur.

Displacement of a Semilunar Cartilage (subluxation of the knee, internal derangement of the knee-joint) is a condition frequently met

with, resulting from sprains and strains of the joint. Any sudden strain or wrench, e. g., turning quickly round in such games as tennis, or slipping off the curbstone with the knee bent, may lead to this accident.

Fig. 281.

Dislocation of the hip backward. The thigh is shortened, sometimes as much as 2 or 3 inches, and cannot be pulled out to its right length as can usually be done in case of a fracture. The knee is drawn up and inward. The heel is raised a little and the big toe rests on the instep of the other foot. There is a marked hollow in front in the upper part of the thigh.



The **Symptoms** produced by this accident are a sudden sickening pain of much severity, located in the knee. The knee becomes partially locked in a bent position and cannot be straightened. The patient may be able to "wriggle" his joint free, or the limb may



Fig. 282.

How to treat (reduce) backward dislocation of the hip: It is best to anaesthetize the patient (put him under ether or chloroform), lay him on a mattress on the floor; take hold of the ankle and bend the knee and the hip, keeping the knee across the middle line of the body, force the knee as high as you can and hold it there firmly for some seconds, then swing the knee outward and bring the leg down straight, as shown by the dotted line and arrow. All this may be summed up thus: "Lift up, bend out, straighten down."

remain stiff for some hours, or even a day or two, when movement suddenly returns more or less spontaneously, a snap being at the same time felt within the joint. In other cases the cartilage remains out of place, until reduced by the surgeon. If the case is not carefully treated, the displacement is liable to recur, the cartilage constantly slipping in and out, getting nipped between the bones; as time goes on, this becomes more and more easy, owing to the ligaments of the joint becoming relaxed from the recurrent attacks of inflammation. In fact, the limb may pass into such a state of chronic weakness as to seriously interfere with the patient's comfort.

In the later stages, when the cartilage is loose, there is usually a spot of localized pain in the front of the joint, and possibly there may be some amount of lateral mobility of the leg, and even movement of the cartilage may be detected on flexing the knee.

The **Treatment** in the early stages consists in replacement of the cartilage by manipulation (pressure with the fingers). The knee is fully bent and then suddenly straightened, pressure being applied at the same time in the neighborhood of the displaced cartilage, which often returns into position with a distinct snap. The limb is subsequently kept at rest on a back-splint, and cooling lotions applied until the inflammation has subsided, and then is further immobilized for some weeks in plaster of Paris, so as to allow the torn ligaments to heal. At the end of six or eight weeks after the accident an elastic knee-cap is applied, and the patient again allowed to move the joint.

Where the cartilage has become loose and is constantly slipping out of place, immobilization of the limb, with pressure over the painful spot by an elastic knee-clip may be useful. Should this not prove satisfactory, operation must be undertaken.

INSTRUCTION FOURTEEN—*Injuries, Brain and Membranes*

Concussion of the Brain

**Compression of the Brain and Traumatic
Epilepsy.**

Subject Reference

For Concussion and Compression of the Brain, see Vol. 1, pages 505-506.

Epilepsy, see Vol. 2, pages 153-431; Prescription page 610.

For Diseases of Brain and Head, see Vol. 2, pages 152-163.

Concussion of the Brain, or Stunning, results from a blow on the head which causes a more or less complete suspension of the functions

of the brain. It varies (with the severity of the cause) from a slight momentary giddiness and confusion of thought to the most complete insensibility. It is closely allied to shock, from which, indeed, it can often not be distinguished.

The **Symptoms** vary greatly in degree. In a well-marked case the stage of concussion is evidenced by unconsciousness, more or less complete, although the patient may sometimes be **roused by shouting** at him; he lies on his back, with the muscles relaxed and flaccid; the eyelids are closed, and the conjunctiva often insensitive; the pupils are equal and often **contracted**, usually reacting to light.¹ The surface of the body is pale, cold, and clammy, and in bad cases insensitive even to strong electric shocks. The respirations are slow, shallow, and sighing, whilst the **pulse** is weak, fluttering, and scarcely sensible to the fingers; the **temperature** is subnormal; the sphincters are relaxed, with perhaps unconscious evacuations from both bladder and bowel. The reflexes are present in the milder cases, though sluggish; in the more severe they may be entirely absent. Thus, if the patient's hand be pricked or pinched he may draw his hand away slowly or he may take no notice.

This condition may last for a considerable time, and then pass slowly into more profound unconsciousness and death, or be followed by inflammation, compression, or brain irritation. If, however, the case is going on to recovery, **reaction** soon begins. The patient must be put to bed, and careful warmth applied to the extremities. The first sign of reaction will probably be a slightly increased rate of both breathing and pulse, whilst he may be able to tell his name and address; but often the earliest indication of recovery is that he turns on his side, and pulls the bedclothes up to his face, since he feels cold and chilly as a result of the lack of blood in his skin (hence the paleness and coldness of the skin). Gradually he becomes more and more rational, and the functions of both mind and body are restored, reaction being fully established by the occurrence of vomiting, due to a condition of cerebral hyperemia following the anemia. Probably he will suffer from headache for some days, and a slight amount of fever will follow; but this passes off, and leaves the patient either quite well, or with a somewhat irritable brain requiring prolonged rest. One consequence of concussion may be that some special function of the brain is permanently lost or impaired, such as memory, hearing,

¹ That is to say, if one's hand be held over the patient's eye so as to shut out the light for a half minute, and then the hand be suddenly taken away, the pupil contracts when the brighter light is allowed to enter the eye. This is termed *reacting to light*.

or vision; thus, a patient may forget the names of places or persons, or may lose all memory of time; or speech may become defective or stammering, or a certain amount of weakness of vision may result. Others seem to suffer from a general loss of nerve tone (neurasthenia), rendering them incapable of fulfilling their ordinary duties in life.

The **Treatment** of concussion is almost the same as for shock. The patient is at once **put to bed**, with the **head low**, and is covered with **warm blankets**; **hot-water bottles** may be applied to the extremities, and **friction** to the surface. Any needless stimulation must be avoided, since it may cause bleeding into the brain; a little warm tea may be given him when he can swallow. When the patient comes to, a good purge, such as 5 grains of calomel, should be administered, and the patient is then kept for some days in bed on a light diet, with the bowels freely open, and all causes of excitement excluded. It is always advisable also to have a doctor as soon as possible in all but the mildest cases.

Compression of the Brain.—Compression of the brain is due to some abnormal and excessive pressure within the skull, which disturbs the functions of the brain. When due to injury, it may arise from the following causes: (a) **Depressed bone** or the presence of a foreign body; (b) **extravasation of blood** within the cranium, either outside the membranes, or on the surface of the brain, or within its substance.

Compression may also arise as a result of hemorrhage, tumors, or abscesses, e. g., as a complication of middle ear disease.

The **Symptoms** of compression are the same as those of **coma**. When the condition is well established, the patient lies on his back absolutely unconscious, and cannot be roused either by shouting or shaking. His **breathing** is slow, labored, and noisy or snoring, the lips and cheeks being puffed in and out. The snoring arises from paralysis of the soft palate, and the puffing of the cheeks from paralysis of the facial muscles. In the later stages the respirations may be more rapid and irregular. Death arises from arrest of breathing. The **pulse** is full and slow at first, but later on becomes rapid and irregular. The **surface** of the body may either be cool, hot, or perspiring; the body **temperature** similarly varies, in some cases being very high, in others low, and where the compressing force is unilateral, there may be some difference on the two sides of the body. The **pupils** tend to become dilated, and not to contract if the light is suddenly let into them.

The symptoms in some cases begin with severe pain or headache. Patients not uncommonly recover from small hemorrhages in the brain causing temporary compression, but rarely so if it is due to depressed bone, the presence of a foreign body, or large exudations of blood, serum, or pus, unless operation can give relief.

The following points should always be attended to in the examination: (1) A rapid examination should be made as to the surroundings of the patient—whether there is blood or vomit near him, how the body is lying, and the nature of the ground. (2) The depth of the unconsciousness should be ascertained, and, if possible, he should be roused and asked to give an account of himself. (3) A most thorough and complete investigation should be made as to his condition. His skull must be first examined, to settle if possible whether there is a fracture present; the surface temperature of the body is noted, as also the character of the pulse and respirations. The tongue should be looked at, as it is often bitten in an epileptic fit, and the smell of the breath should also be noted. The condition of the pupils may throw some light on the case; in opium-poisoning they are small and equal, a condition also seen in hemorrhage into the under part of the brain; in drunkenness they are often dilated and fixed, but vary considerably with the depth of the coma.¹ The amount of power and the state of the reflexes² are then observed, any difference between the two sides of the body probably indicating a one-sided injury in the brain. The urine must be drawn off, and carefully examined for albumin and sugar (to see if there is either Bright's disease or diabetes). (4) In doubtful cases, and especially where there is any suspicion of drunkenness or poison, recourse may be had to the stomach-pump to see what is in the stomach. (5) Finally, if the cause is still uncertain, the patient should be put to bed and carefully watched.

The **Treatment** of compression must be, where possible, directed to removing the cause, by operation. Failing such, keep the patient quiet, with the head low and cool, the room dark and noiseless, the bowels open (using enemata for this purpose), and the bladder empty. The patient may have to be fed by the bowel. Considerable interference with the respiration may arise from falling back of the tongue: the head must then be rolled over to one side, or the tongue pulled forwards. Occasionally patients remain in this condition for weeks or months.

¹ *Coma* is unconsciousness.

² *Reflexes*, are signs of feeling such as winking when the eye is touched, drawing away the hand or foot when it is pinched or tickled, etc.

A not uncommon form of disease in the skull is stoppage of the large blood passages by clotting. It may occur after injuries, but usually is a consequence of inflammation in the middle ear (eardrum). It may be due to injury to the scalp or may come from erysipelas of the face, or from disease in the nose. The patient has a high temperature, which may go down at times; there are also chills, headache and continued vomiting. The eye may become very prominent and congested with swelling of the eyelid and face, or the eyelid may drop down and the patient not be able to open his eye.

Treatment consists in prevention, except when the trouble is behind the ear, when an operation is the only thing.

Traumatic Epilepsy is an epileptic condition resulting from injuries. It may arise from any of the following conditions: (1) A neuralgic and irritable scar in the scalp; (2) a slight unrelieved depression in the skull; (3) excessive formation of callus¹ after a fissured fracture, or chronic thickening of the bone from inflammation, whereby the brain is pressed upon and irritated; (4) chronic meningitis, usually associated with an adherent scar in the brain; (5) a single depressed little piece of bone projecting into the brain. The **Symptoms** produced are epileptic seizures, with or without a definite warning sign. The **Treatment** is not particularly satisfactory. A surgical operation is the only likely cure. If it is decided that an exploration is desirable, the sooner it is undertaken the better, since the longer the epileptic habit lasts, the less favorable is the case.

INSTRUCTION FIFTEEN—*Injuries of the Spine*

Subject Reference
For Deformities of Spine,
see pages 140-144.

For Diseases of the Spine
including Angular Curvature
of Spine (or Hunch-Back),
see pages 183-189.

Sprains and Strains of the Spine

Spinal Meningitis Occasionally Arises from Simple Injuries.

The spinal column has a variety of useful functions in the body. This causes it to be an exceedingly complicated structure, and exposes it to many forms of injury. Its chief use is to act as a pillar or axis of support to the trunk, connecting the distant parts of the skeleton together; this is effected by the massive bodies of the vertebræ piled one on the other. Its flexibility and mobility are secured by the number of bones of which it consists, and the elastic cartilages between them. It also serves as a tube in which the spinal cord is

¹ *Callus* is the thickening of a bone which occurs in healing after fracture.

safely lodged, whilst lateral openings are left between the bones to allow the nerves to pass out from the spinal cord.

The spinal cord is protected from injury in a most complete and effective way. (a) Its position between the bodies and the arches of vertebræ, with the spinous processes arising therefrom, is itself mechanically advantageous, since, in whatever direction the spine is forcibly bent, the cord remains midway between the points of chief compression or extension, and hence in a position of rest. (b) The buffer-like action of the intervertebral discs, and the curves of the column, serve to diffuse and reduce the force of any violence reaching it. (c) There is ample space in the medullary canal, in which the cord with its membranes is slung by prolongations of the membranes around the issuing nerves, whilst the cord itself hangs loosely within the membranes, suspended by ligaments and surrounded on all sides by cerebro-spinal fluid. (d) Moreover, the cord ends, in an adult, at the lower border of the first lumbar vertebra, a spot well above the junction of the fixed base (the sacrum), and the movable upper part of the spine; it is at this latter point where the effect of jars and wrenches is mainly felt. (e) Nature has, moreover, inserted a whole series of buffers and other means of preventing shock reaching the spine when a person falls on his feet, e. g., the arches and elasticity of the foot, the changes in direction of the bones at each joint, the interarticular cartilages of the knee, etc.

The parts of the spine most exposed to injury are those where a fixed and a movable portion meet, e. g., the dorsi-lumbar (where the small of the back joins the part with ribs) and the cervico-dorsal (the base of the neck) regions. The upper part of the dorsal curve, which is relatively weak and projects backwards, is thereby exposed to injury, so that fractures are not at all uncommon about the fourth dorsal vertebra (between the shoulders). The close proximity of the upper part of the neck to the head explains the frequency of injuries in that region.

Sprains.

Sprains and strains of the spine are exceedingly common accidents, a fact not to be wondered at, when we consider the complicated muscular and ligamentous arrangements present. They may be produced by any sudden or unexpected movement, such as falls, especially from horseback, railway accidents, and the like, or from a severe blow on the head. The injury is most likely to affect mobile parts of the spine, e. g., the neck and lumbar regions, and may be

limited to the ligamentous or muscular structures, or may involve both.

Treatment.—The patient should be kept at rest, and hot fomentations applied to the injured part. When the painful or inflammatory symptoms have disappeared, massage with stimulating liniments is needed.

Spinal Meningitis.—Inflammatory conditions of the spinal membranes may spread downwards from the head, or commence as a local affection. As a result of injury two forms are met with:

(a) **Acute Spinal Meningitis** may occasionally arise from simple injuries, but is most commonly septic in origin, following penetrating wounds. The disease is usually ushered in by a rigor, especially in the septic cases, and will then run a marked course, with fever. The symptoms are: pain in the back, deep-seated, boring, and severe, increased on all movements, and often extending down the limbs or around the body; rigidity of the spine and limbs, accompanied by painful cramps and muscular spasms, almost simulating a lockjaw convulsion; marked over-sensitiveness, especially of the legs, whilst rapid emaciation from the pain and sleeplessness is soon produced. **Treatment** in the cases due to a penetrating injury is of no avail if prevention of the disease by asepsis fails. In simple cases an icebag should be applied to the spine, the patient remaining in the prone position, and general measures to allay inflammation adopted.

(b) **Chronic Meningitis** either originates as a chronic affection, or is the outcome of an acute attack. The **Symptoms** are those of localized pain and rigidity in the back, increased on all movements, and accompanied by shooting pains and perhaps muscular pains and cramps. **Treatment** consists in prolonged rest, with counter-irritation in the form of blisters or the cauterly applied to the back, whilst mercury is administered internally.

INSTRUCTION SIXTEEN—*Bone Diseases*

Subject Reference
For Injuries to Bones,
see pages 96-106.
Boney Tumor, page 62.

Bone Diseases Requiring Surgical Treatment

ACUTE INFLAMMATIONS OF BONE.

1. **Acute Localized Periostitis** usually arises as a result of direct injury to the bone, with or without an open wound; it may also be due to general conditions, such as rheumatism, gout, and pyemia, or by an extension of inflammatory mischief, as in an alveolar abscess (tooth abscess).

Necrosis (or death) of bone may occur in a variety of forms, and from many different causes. It may involve a small mass only (which may be absorbed or removed by the blood), or it may involve a large part of bone forming a sequestrum, which must be taken out before the bone can heal up.

Caries, or, as it is sometimes called, **rarefaction of bone**, is a condition resulting from inflammation. There arises a soft and spongy state of the bone, which, if it can be reached, readily breaks down on pressure with a probe.

The **Symptoms** of acute localized periostitis consist in the ordinary signs of an acute inflammation, the pain being of an intense aching character, markedly worse at night, and increased by lowering the limb or by any kind of pressure. If a subcutaneous portion of bone is involved, a painful swelling is felt, at first brawny in character, but, when suppuration has occurred, the center softens, whilst the skin over it becomes red and puffy. When an abscess has burst or been opened, bare bone is felt beneath the periosteum, and the greater part of this bare portion usually dies, and must then be either absorbed or separated. From this either pus or serum will be discharged, according to whether the wound has become septic or not. In about five or six weeks' time the sequestrum is loose, and this may be ascertained by moving it with a probe within the cavity, which is now lined on the inner aspect with granulation tissue.

Treatment.—Rest, elevation of the limb, leeches, and hot fomentations are usually relied on locally in the early stages. If, however, the affection is not readily checked, and suppuration threatens, a surgical operation is necessary.

2. **Acute Infective Osteo-myelitis (Acute Necrosis, Acute Diffuse or Infective Periostitis).**—This disease usually occurs in children, and not unfrequently follows one of the rashes (e. g., measles or scarlet fever). It generally commences before the age of puberty, and is an affection of the gravest import. It may result from some slight injury, which under other circumstances would do but little harm.

The patients are always in a state of depressed general health, so that their germicidal powers are considerably diminished. Moreover, spots of localized ulceration are often present in the throat, mouth, and intestines, which give a ready entrance for micro-organisms into the system. A slight injury, which is often entirely overlooked or

forgotten, may suffice to determine the commencement of an inflammatory process which rapidly spreads until the whole structure of the bone may be affected.

Signs.—The disease usually commences abruptly with a rigor (or chill), followed by high fever and severe pain in the limb, which soon becomes swollen, brawny, and congested. It may at first be mistaken for an acute attack of rheumatism, although the fact that the bone away from the joint is affected, and not the joint itself, should readily prevent this error.

The **Prognosis** is always somewhat grave. Life may be threatened by blood poisoning in the early stages, while later on exhaustion may terminate the case if sepsis has been admitted.

The usefulness of the limb is subsequently unimpaired if the disease has not been too extensive, and if prompt treatment has been adopted; but if neighboring joints are affected, or if the bone-forming powers of the periosteum have been destroyed by the acuteness of the process, amputation may be required. In cases which have recovered, excessive growth of the bones will often follow, owing to the long-standing hyperæmia of the part; but if the epiphyseal cartilage has been much affected the limb may be stunted in its subsequent development.

Treatment.—Prompt surgical measures must be adopted in order, if possible, to cut short the malady. As soon as the local pain and high fever give evidence that this affection is present an operation is urgently necessary.

Chronic Inflammation of Bones.

Chronic Osteo-periostitis.—This is a chronic inflammatory condition of the bone, which results in overgrowth, thickening and condensation.

The **Symptoms** consist of deep aching pain in the limb, worse at night, with perhaps tenderness over some particular spot.

The **Treatment** at first consists in resting the limb, applying counter-irritation (e. g., iodine paint or the actual cautery), and giving iodide of potassium internally. If relief is not thereby obtained, an operation should be had. In some of the most aggravated conditions, which have lasted for many years, amputation may be required.

Tubercular Diseases of Bones.

Bones may be affected in two ways by tuberculosis, either (1) by periosteum or (2) the spongy tissue being first and chiefly involved.

1. In **Tubercular Periostitis** there are tubercle bacilli that cause the formation of tubercles or little growths. As in tubercular disease elsewhere, caseation and suppuration are likely to follow, leading to the formation of abscesses which are at first under the periosteum, and filled with curdy pus; these in time find their way to the surface, either directly or by more or less tortuous channels, and leave sinuses, or channels, extending down to the bone. Occasionally the disease may spread along the periosteum for some distance, and even involve a neighboring joint.

The **symptoms** consist in a localized swelling of the bone, together with the characteristic form of pain associated with chronic bone disease, but not so severe as in the deeper varieties. If an abscess forms, the pain becomes greater, but it diminishes again as soon as tension is relieved by letting out the pus.

Treatment.—An operation is the proper treatment if the disease is well developed. In the early stages of this disease, constitutional treatment may suffice, together with rest and carefully adjusted pressure on the diseased part.

2. **Tubercular Osteitis** always arises in spongy bone. It affects the short bones, or the shafts or ends of long ones.

The short bones of the hands and feet are very liable to this condition. It occurs in weakly children with a tubercular inheritance, or in those whose general health has been depressed by one of the rashes, or sometimes in those otherwise healthy. Some slight injury may cause the attack.

The affected bone becomes slowly enlarged, expanded, and painful, the pain being, however, slight in amount, though generally worse at night. This continues for some time, until finally one spot rapidly increases in size, becoming red and tender, and finally an abscess forms, which bursts or is opened, leaving a sinus. Occasionally adjacent joints are also involved in this process.

The **treatment** in the early stages consists in attention to the general health, together with rest locally, and perhaps strapping the parts. Should the disease progress in spite of such measures, an operation is necessary. When the disease has progressed so as to involve neighboring joints, amputation may be necessary.

Rickets.

Rickets is a general disease of malnutrition (poor nourishment), occurring in children, and manifesting itself mainly in bone disorders.

It usually commences within the first three years of life, and may be congenital, but sometimes appears later.

Causes.—Any and every fault in the feeding and in the hygienic conditions of a child seems capable of inducing rickets; but the most important causes are insufficient or improper food, especially the too early administration of starchy materials; while uncleanness and want of air and light also lead to it. Rickets is especially common in the poorer classes, who are herded together in small and badly ventilated rooms, and is so peculiarly frequent in England as to be known in Germany as the “English disease” (*Englische krankheit*).

The **symptoms** are early or general, and later or bony. The general symptoms are mainly due to a state of irritability of the stomach and bowels. The child may be fat and flabby, or thin and emaciated; the mucous membranes are pale, and vomiting and diarrhea are constantly present, the motions often being green, slimy, and very offensive. The spleen is enlarged (and may be felt as a solid body under the lower left ribs), the abdomen is prominent (pot belly), and profuse sweating of the head is very characteristic.

The commencement of the osseous changes is usually indicated by increasing irritability and restlessness, the child tossing off his bed-clothes at night, and crying out when handled or touched. The joint ends of the long bones become enlarged, as also the junction of the costal cartilages with the ribs. Sooner or later the shafts of the long bones soften, and may bend in various directions, and thus a considerable variety of deformities may be produced.

The head usually becomes flattened, so that the forehead appears square in shape and enlarged. The forehead may become very prominent on either side. Less commonly, if the child lies much on the side of the head, it becomes laterally compressed, the front-to-back diameter increasing in length. At the same time, the fontanelles (open spaces in the top of a baby's skull) remain open much longer than usual, and softening of the bones may be observed in the back part of the skull. The teeth do not appear till late, and are stunted, defective in enamel, and easily eroded.

The spine may be affected by lateral or other curvature.

Changes on the thorax are produced by enlargement of the junctions of the rib-bone with the rib-cartilage (beaded ribs), which, when present on either side of the sternum, produce what is known as the “rickety rosary.” The atmospheric pressure may cause the softened bone and cartilage to sink inwards, and as a result of this the sternum may be pushed forwards (pigeon breast).

The deformity of the long bones usually consists in an increase in their natural curves, these being especially marked at points where powerful muscles are attached. There may also be knock-knee or bow-leg. Growth, too, is often much impaired by this disease, so that the individual may become stunted and dwarf-like.

In the **treatment** of rickets the most essential feature in the early stages is the correction of all errors in the personal hygiene. The diet should consist of good cow's milk, diluted if need be, and with lime-water added; while the juice pressed out of raw beef, or one of the many meat juices now sold, may also be administered. The condition of the bowels must be attended to, and the child placed in as good sanitary surroundings as possible. Compound syrup of iron phosphate may be given alone, but if the infant is thin and emaciated, cod-liver oil should be added, but not if fat and heavy. Deformities must be prevented, if possible, by keeping the child lying down, and not allowing it to crawl or run about. The early stages of deformity may often be corrected by daily manipulation (such as pressing and rubbing in such a way as to strengthen the bone) of the affected bones, and in the later stages they may be improved by suitable apparatus for holding the limb, combined with pressure.

Tumors or new growths occur in bone. The symptoms are at first like those of chronic inflammation of the bone and periosteum, but with not so much pain. The bone becomes enlarged near one end, but the joint is seldom involved. The bone may break very easily, sometimes without any force having been applied to it.

The **treatment** consists in an early operation to remove the diseased bone.

INSTRUCTION SEVENTEEN—Diseases of Joints

Hip Disease *Tubercular Disease of Joints*

INFLAMMATION OF THE JOINTS.

Synovitis is an inflammation limited almost entirely to the synovial membrane,¹ the ligaments and other structures of the joint being usually but little affected.

The **causes** of synovitis are local or general. Local conditions in-

<p><i>Subject Reference</i> <i>For Injuries to Joints,</i> <i>see pages 107-118.</i> <i>For Rheumatism,</i> <i>see pages 365-370.</i> <i>For Deformities, see</i> <i>pages 139-152.</i></p>

¹The synovial membrane is the lining of all the spaces in a joint. It extends around tendons that pass over the joint and form sheaths for them. It does not cover the cartilage on the ends of the bones. It furnishes a clear fluid termed *synovia*, which is like white of egg and serves to lubricate the joint.

clude cold and injury ; general or constitutional comprise rheumatism, gout, etc. The inflammation may be acute, subacute, or chronic.

Acute Synovitis.

The **signs** of acute synovitis consist in the joint becoming painful and distended, while if it is superficial, as in the knee, a sense of heat may be given to the hand, and the surface may even be red. The limb is kept in that position which gives the most ease, viz., that in which the capacity of the joint is the greatest, and this is usually one of slight flexion. The muscles governing the movements of the joint have occasionally been noticed to undergo rapid wasting.

When the acute stage has passed, the joint is usually left in a somewhat weak and relaxed condition, with a little fluid in it, or perhaps some stiffness.

The **treatment** of acute synovitis of simple origin consists in keeping the joint still and supported as to give the patient the greatest amount of ease, while, should stiffening result, the limb is left in as favorable a position as possible for subsequent usefulness. Necessarily, in all severe cases of acute synovitis the patient should be confined to bed and the limb elevated.

In the subacute stage, when the joint is weak and relaxed, massage or friction with stimulating liniments should be employed, while in the more chronic forms firm pressure (preferably by means of a rubber bandage) is most useful as an additional measure. An operation may be needed for a stiff joint.

Chronic Synovitis.

This affection follows an acute attack, or may be set up by some injury or condition insufficient to cause a more violent form of inflammation. The pain is not so severe, being replaced by a sense of uselessness and weakness.

Treatment consists in fixing the joint in a suitable position, and applying counter-irritation and pressure ; blisters are especially useful in this affection. At a somewhat later stage, elastic pressure by a Martin's (elastic or rubber) bandage may be employed, together with friction with stimulating liniments, or even hot-air baths.

Acute Arthritis.

Arthritis is inflammation of a joint which tends to involve all the structures of which it is composed, viz., bones, ligaments, cartilages, and synovial membranes. Rheumatism, wounds, low state of health,

a slight strain in a child after measles or scarlet fever, or any severe fever, are the chief causes.

Course of the Case.—In the early stages acute arthritis appears as a very acute synovitis, combined with severe pain and fever. The pain is often so intense that the patient cannot bear the limb touched or the bed shaken, and indeed the slightest jar of the limb is so exquisitely painful that the patient may scream with agony. The joint itself is distended and the tissues around are hot, red and puffy. The patient naturally places himself in that position in which the limb obtains the greatest ease, and therefore usually partly bends the joint and fixes it so by muscular contraction.

Treatment.—In the early stages the limb must be elevated, kept absolutely still, and put into such a position that, if stiffening subsequently results, it may be of some use to the patient. Hot fomentations or an icebag may be temporarily applied. This treatment should be continued until all signs of inflammation, pain, heat, and startings of the limb, have passed away. Under such a plan of treatment it is sometimes possible to obtain a movable joint, but more frequently stiffness must be expected. If the patient is suffering from severe symptoms threatening life, amputation may be required.

In the rheumatic cases where suppuration is not expected or does not threaten, the joint should be elevated and kept absolutely at rest; counter-irritation by means of blisters, or even the actual cautery, may be useful, while suitable constitutional treatment is adopted under medical advice.

The **Knee-joint** is more frequently involved by acute arthritis than any other joint, and is usually infected from without. The symptoms are exceedingly typical: there is great pain and heat of the joint, which is distended to its utmost capacity, the limb lying semi-flexed and on its outer side. Left to itself, the capsule gives way, and suppuration rapidly extends upwards or downwards into the leg, ultimately finding its way to the surface. The deformity gradually increases, until in the worst forms the tibia slips behind the femur, the leg is flexed to a right angle and rotated outwards, and if the limb has long rested on its outer side, considerable lateral displacement may also occur. Early and efficient treatment will usually prevent such a disaster.

Tubercular Disease of Joints.

Tubercular Arthritis, White Swelling.—This is tuberculosis in a joint, especially the hip and knee.

The **causes** are as follows: The person is predisposed to tubercular disease, usually as the result of a hereditary tendency, often having a family history of tubercle; the general health of the patient may be at fault, owing to insufficient or unsuitable food, bad hygienic surroundings, or exposure to cold; it occasionally follows one of rashes (measles, etc.).

The disease usually commences in a most insidious manner. It may be dated back to some injury, but as often as not no such occurrence has been noted. Slight impairment of movement, together with some pain, especially when the limb is jarred or twisted, is perhaps the first sign, causing the patient to limp if one of the legs is involved. This becomes more and more marked, and the joint is fixed, usually in a partly bent position, while it looks slightly swollen. It is white, smooth, and rounded, the swelling being more marked on account of the wasting of adjacent muscles. The part feels hotter than that on the opposite side of the body; the swollen tissues are elastic and puffy.

From time to time great increase of pain and swelling occur, which subside after a few days, but leave the joint more and more crippled. Sooner or later abscesses are likely to form, with increased local disturbance, and often starting pains at night, together with slight general fever and feeling of wretchedness. If they burst, temporary relief follows; but as the discharge continues, fresh abscesses form. The patient has a rise of temperature every afternoon, and finally, exhausted partly by the discharge, partly by the pain, and partly by the want of sleep, becomes emaciated, and, unless prompt measures are taken for his relief, may even die.

Results.—(a) If taken in the early stages, and suitably treated, the disease may be entirely cured, and a movable joint result. (b) More frequently the joint structures are so severely damaged, that a cure can only be got by stiffening of the joint. Unless measures have been taken to maintain the limb in a satisfactory position, permanent deformity may ensue. (c) Acute general tuberculosis is often a result of this affection; while similar associated disease of the lungs, brain, kidneys, or other organs may become tuberculous.

The **prognosis** is mainly influenced by the condition of the individual and his surroundings. In children of the better classes, where every hygienic and medical assistance can be given, recovery generally follows, unless there is a counterbalancing hereditary tendency. Among the poorer classes, and especially in "slum children," the outlook is correspondingly serious. Moreover, the extremes of life are

unfavorable: babies resist tuberculosis badly, and patients over fifty have comparatively little power of recovery; hence radical rather than conservative measures have often to be resorted to in these two classes.

The **treatment** of tubercular joints varies not only with the articulation affected, but also with the type of patient, and the extent to which the disease has advanced.

1. **Hygienic Treatment.**—Local tuberculosis is a sign of a general condition of weakness which can often be overcome by suitable constitutional treatment. It is not like cancer, over which natural processes have no control, and for which the only hope of cure lies in the complete removal of the disease with the knife. Consequently, in the early stages, many cases of white swelling can be cured by keeping the limb absolutely at rest, by means of splints, plaster of Paris, etc., and elevating it if there be much pain. The general health should be improved by sending the child to the country, giving it plenty of good food, and administering cod-liver oil and syrup of the iodide of iron. An endeavor must be made at the same time to correct any faulty position of the limb by a process of gradual extension rather than by the sudden application of force, whereby tubercular material may be spread through the system. The cure takes time, and hence cannot always be carried out amongst hospital patients. Counter-irritation by blistering or iodine paint is sometimes useful, but should not be persevered in too long. A good surgeon should be consulted and if an operation is needed it should not be put off.

The **Knee-joint** is, perhaps, more often affected with tubercular disease than any other articulation. A doctor should be consulted and given charge. An operation may be necessary.

Loose Bodies in Joints.

Several varieties of loose bodies are met with in joints, which may be described as follows: (1) The so-called "melon-seed bodies" consist of dense tissue derived from altered blood-clot, or more frequently from a fibrinous exudation in cases of very chronic tubercular disease. (2) Portions of the articular or interarticular cartilage may be broken off as a result of mechanical violence. (3) They are sometimes derived from the development of cartilaginous nodules (gristly humps) in the synovial membrane. (4) Finally, portions of bone may become separated from their surroundings, and remain loose in the cavity.

Although cut off from all vascular supply, the growth of these loose bodies is said to continue, owing to the highly nutritious fluid which bathes their surface.

The **Symptoms** caused by this condition are produced by the loose body being occasionally caught between the bones, leading to a temporary locking of the joint, and with severe pain, owing to the stretching of the ligaments. The fixation is but momentary, since the foreign body is readily displaced, but an attack of inflammation follows. When this has happened several times, there is a tendency for the ligaments to become relaxed, and for the joint to become somewhat loose and distended. Under such circumstances the patient may be able to feel the foreign body and to shift its position, and frequently the surgeon, owing to its ready mobility, is unable to detect the intruder as it slips away into the interior of the joint. The German term, "Gelenkmaus" (joint mouse), is very appropriate. The knee-joint is that most frequently affected, but the same condition occurs in the elbow and jaw joint.

The **Treatment** consists in the removal of the foreign body by operation.

Neuralgic Joints.

In "nervous" individuals, especially young women, a neuralgic condition of the joints is common. It is like disease of the joint. On careful examination the pain is found to be superficial, not increased by jarring the articular surfaces together, and often not strictly confined to the joint. The movements are apparently limited, but best under chloroform or dentists' gas, or if the attention of the individual is diverted they are found to be perfectly free. There are no signs of effusion into the cavity, and no starting pains at night. Occasionally a similar condition is met with in men, where there is no hysteria, as in the preceding.

The **Treatment** is directed towards improving the general health, and regulating the uterine functions. The best local treatment is the use of cold douches and electricity. Counter-irritation in the shape of blisters, or even the actual cautery (passing a hot iron rapidly over the painful places about the joint—rapidly so as only to redden the skin well), has an excellent effect.

Hip-joint Disease.

The term "hip-joint disease" is usually applied to tuberculosis of the hip-joint. This, however, is not the only disease of this joint.

Simple synovitis of the hip occurs in the course of rheumatic and other affections.

Tubercular Disease of the Hip differs in no respect from the same disease as it affects other joints.

Fig. 283.

Hip-joint disease (tuberculosis of the hip-joint). A tuberculous abscess has formed in the neck of the thigh bone (of which only the upper portion is here shown). Must be treated by a doctor.



Course of the Disease.—The patient, usually a child, is observed to limp, and may complain of pain either in the hip or knee (the latter being due to the fact that both joints are supplied by the same nerves). There may have been an injury, but not always. On examining the limb in the **early stage**, it is usually found to be **apparently lengthened**, whilst the thigh is slightly wasted. The buttocks are flattened, partly due to atrophy of the muscles, partly to the flexion of the limb. The joint is more or less rigid, and pain is produced on attempts to move it, or on jarring the limb, as by striking the heel or the top of the thigh bone. The position of the thigh in this early stage is one in which the hip-joint is more and more bent (but not much at first), and the knee and foot are turned outward more and more. The reason for this is that thereby the ligaments are most relaxed, and the capacity of the joint is at its greatest. But this may not always be evident, as the back may be curved (more hollowed in the small of the back). The pelvis may be tilted down on the diseased side so as to bring the knee inward to its usual position. That the joint is diseased, however, may be proved as follows: Lay the child on his back on a bed; bend the sound thigh up as far as possible (against the abdomen) and see if the other leg can be kept flat on the bed; if not, the joint is diseased. By laying a rod across from one bony point on the front of the hip-bone to the corresponding point on the other side, and placing another at right angles to its center, it will be seen that this latter rod will not correspond with

the line of the body, or of the limb, but makes an angle with it. The foot is always toes outward. The rigidity is easily made out, because that all movements of the hip-joint are greatly limited; thus if an attempt is made to bend the affected limb on the abdomen, the corresponding side of the pelvis will be drawn up with it from the bed.

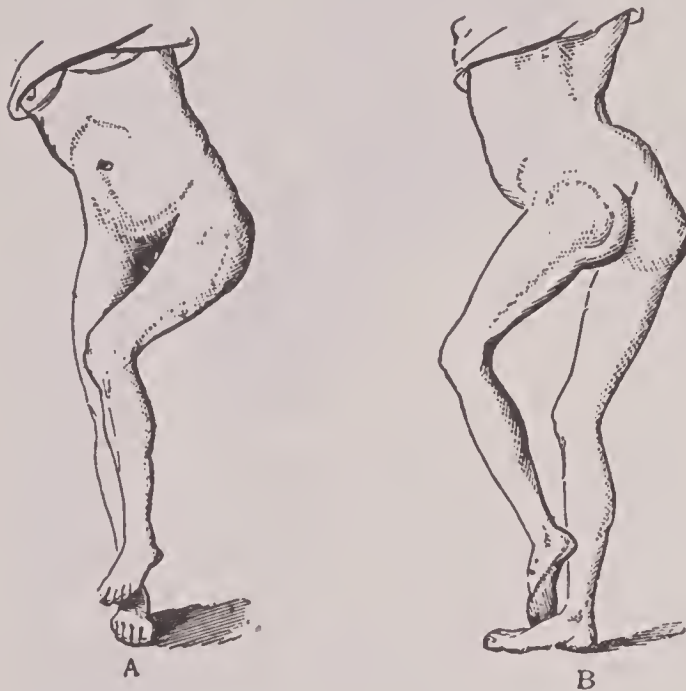


Fig. 284.

The position of the leg in an advanced stage of hip-joint disease. The knee is drawn inward and upward, and the back is much hollowed (strongly curved in the small of the back) when the patient stands up, because the hip-joint is stiff and will not straighten out well.

As the disease progresses, and the bones become more affected, the pain increases, with startings at night. Abscesses form, and a certain amount of fever and constitutional disturbance is caused thereby. The position of the limb also changes; for although the bending is kept up, and even increased, the knee is now drawn in and the toe turned in. The pelvis is tilted up on the affected side, causing **apparent shortening**, lateral curvature of the spine toward the sound side, and the healthy limb is swung out (so as to be parallel with the other one). When an abscess has formed, the most usual situation for it to point is a little in front of and internal to the top of the thigh bone. Less frequently abscesses may pass directly backwards to open in the region of the buttock, or forwards to the front of the thigh near the groove that marks it off from the body.

The final stage of the disease is one of **real shortening**, due to erosion of the head of the bone, and its displacement backwards. The position of the leg is more marked.

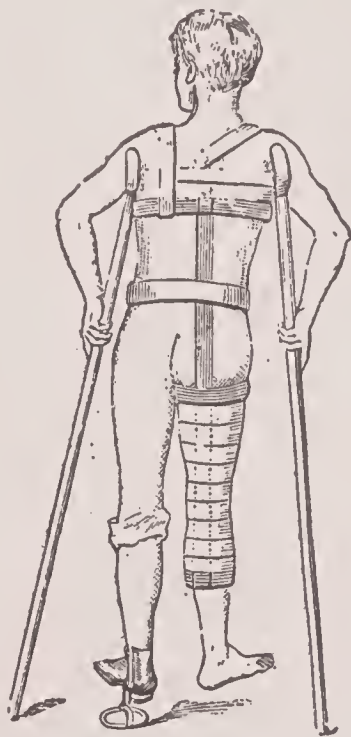
At any stage cure by ankylosis (stiffening of the joint) may be

obtained; but unless the abnormal position has been corrected considerable deformity may ensue.

The **Diagnosis** of hip disease appears to be a matter of considerable difficulty to some, judging from the mistakes which so commonly occur. The pain in the knee present in the early stages leads to its frequently being mistaken for disease of the knee. From disease of the **opposite hip**, it is recognized by the relative mobility of the thigh on the two sides. It may also be confounded with **spinal mischief**, if a psoas abscess points at any of the ordinary situations

Fig. 285.

To treat hip-joint disease (tuberculosis of the hip). The leg is kept fixed and at rest by the splints and bandages; a stilt or support is placed under the shoe on the *sound side* and long crutches are used, so as to prevent any weight being put on the lame leg.



in which sinuses form in connection with the hip-joint. The presence of spinal deformity and the ability to perform the test movement for hip disease should readily enable the surgeon to see that it is the spine and not the hip that is diseased, but it must not be forgotten that the two conditions not unfrequently occur at the same time. If the child can sit in what is known as the tailor's position it is certain that hip disease is not present.

The **Outlook** of hip disease, if the condition is properly treated, is by no means bad. Of course, the patient is liable to develop acute tuberculosis or tubercular disease elsewhere; or, if abscesses are not properly cared for the patient may be very much run down, and die. Apart from these, however, no serious consequences affecting life need be feared, although the usefulness of the limb may be seriously

crippled from shortening or ankylosis, especially if it stiffens in a bad position.

The **Treatment** of hip disease is the same as for tubercular disease elsewhere. A doctor should be consulted as soon as any of the preceding signs appear. In the **early stages** the limb must be kept at rest by the application of a long splint, or it may be placed between sandbags, and a weight and pulley attached. By this means not only

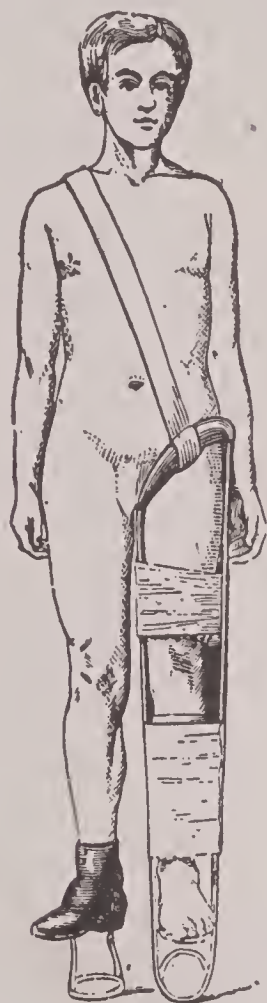


Fig. 286.

A device to take the weight off the foot in hip-joint disease. The sound side has a "stool" under the shoe. The weight of the body is supported from the "sitting" bone on a padded ring around the hip; the ring is held up by the strong iron splints.

is rest assured, but deformity is prevented. If the amount of flexion of the joint is but slight, the limb may be allowed to rest on the bed horizontally; this will possibly lead to some compensatory curving of the spine, but as the muscular spasm relaxes, the curvature of the spine disappears. The general health of the patient must at the same time be attended to, and cod-liver oil and syrup of the iodide of iron may be administered with benefit. When the more urgent symptoms have disappeared, a Thomas's hip-splint should be applied, so as to enable the patient to get about.

Various Kinds of Deformities

Wry Neck, Curvature of the Spine, Webbed Fingers, Knock Knees, Bow Leg, Club Foot, Flat Foot, Hammer Toe, and other Deformities.

Subject Reference

For Injuries to Spine, see pages 122-124.

For Angular Curvature or Hunch-Back, see Diseases of the Spine, pages 183 to 189.

Wry Neck, or torticollis, is a deformity produced by a contraction of the muscle that goes from the skull behind the ear to the collar-bone and breast-bone. Other muscles in the neck may also be shortened. The affected side of the head is drawn down towards the shoulder, whilst the face is turned towards the sound side. When this has lasted for some time, especially when the wry neck is present at birth and in those commencing in childhood, the affected side of the head and face becomes wasted.

The **Causes** and **Varieties** of wry neck may be classified as follows:

1. **Congenital** torticollis, the result of changes before birth.
2. **Muscular** torticollis, due to contraction of the muscle, apart from nervous causes. It often occurs as a temporary deformity resulting from cold (rheumatic myositis, or stiff neck).
3. Torticollis arising from **nervous** causes, including spasm and paralysis. **Spasmodic** torticollis may result from (a) the direct irritation of the nerve trunk or its roots, as by inflamed glands or disease of the spine in the neck; (b) reflex irritation, as by decayed teeth, and possibly worms or ovarian trouble, occurring sometimes in hysterical patients; and (c) from irritation of the deep or cortical centers in the brain. This occurs most frequently, though not exclusively, in women of about thirty years of age, and there is often a family history of nervous diseases, such as epilepsy, etc. The prognosis in these cases is almost always unfavorable, since, even if the localized spasm is cured by appropriate treatment, other parts are likely to become affected.

The **Diagnosis** of torticollis is readily made. It must not be confounded with scar contraction of the skin of the neck following burns, or the attitude temporarily assumed by a patient with an acute deep-seated abscess of the neck, or with tubercular disease of the spine. The rigidity of the neck in the latter case, together with the pain caused by movement or pressure over the vertebræ, shows that it is not wry neck. Rheumatic contraction of the deeper ligaments and muscles of the neck may also be mistaken for torticollis, but it comes on rapidly, and is associated with tenderness on deep pressure.

The **Treatment** of torticollis necessarily varies with the cause upon which it depends, and thus may call for remedies for inflammation, nervous, rheumatic, or syphilitic trouble. Where, however, it is due to congenital or continuous contraction of the muscle or its tendon, massage and manipulation may be first tried, or even some form of mechanical apparatus; but in the majority of cases an operation to cut the muscle or its tendon will give a more satisfactory result, and is much less tedious and troublesome.

A **Cervical Rib** (or a rib in the neck, above the regular first ribs) is a deformity of somewhat unusual occurrence. No symptoms are produced for many years, but as the mass grows, it tends to compress the nerves and blood-vessels, and thus lead to neuralgia and some weakness or loss of power in the arm. The cause of these symptoms may be overlooked. There may be heart symptoms and also dilated pupil of the eye from the pressure of the rib on the sympathetic nerve. Nothing should be done to this condition unless symptoms are present, when removal may be required and should not be delayed.

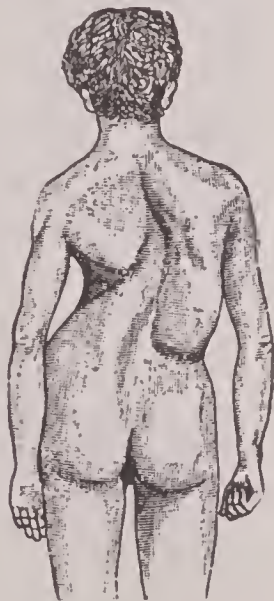


Fig. 287.
Scoliosis or lateral curvature
of the spine.

Deformities of the Spine.

Scoliosis.—This is a condition of lateral curvature of the spine. It may commence in children at an early period of life as a result of rickets, owing partly to the softened and rarefied condition of the bones, partly to their irregular and uneven growth. It is probably often induced by the method of carrying children on one arm in vogue with nursemaids. A similar change, due to the so-called “delayed rickets,” may also occur later on in children who are able

to run about. Congenital shortness of one leg, dislocation of one hip, contractions of the knee or hip joints, knock-knee, falling in of the chest wall as a result of disease of the lung, and even old-standing wry neck. The most common form of spinal curvature, however, is that known as the **scoliosis of adolescents**, met with in young people about the age of puberty, or a little older, who are in a weak and run-down condition, often as a result of excessive growth, combined possibly with improper food, defective hygienic surroundings, or hard work, whereby muscular fatigue is induced. Young women with anemia who suffer from amenorrhœa, or who as housemaids or factory hands have to do a good deal of lifting, are especially liable to this condition. It is due to a relaxed state of the ligaments and muscles, being not unfrequently associated with flat foot and knock-knee. Prolonged standing in a position of ease or rest, in which the weight is mainly carried on one leg, may cause it, as also faulty positions occupied by children at school, owing to low desks and want of support to the feet. As a rule, the curve in the small of the back forms first, its convexity being to the left side, a compensatory dorsal curve, with its convexity to the right, being subsequently developed. The ribs, sternum and collar-bone are all affected. The shoulder may become very prominent on one side. It is for this "growing out of the shoulder" in young women that the majority of cases come under observation. The left shoulder is usually somewhat lower than the right. The effect on the **waist** also varies; on the right side the true waist becomes more marked than usual, and the hip bone is thought to be "growing out." On the left side the true waist becomes flattened. In addition to the above phenomena, the buttocks may be noticed to be uneven, the pelvis being tilted down on the left side.

In the early stages the characteristic deformity disappears on extension of the trunk, as by hanging from a trapeze, or on bending forwards; but as it progresses, the spine becomes more and more fixed, and but little alteration is produced by suspension of the patient. In the worst cases the deformity becomes so marked as to simulate the "hump" formed in Pott's disease, and the patient's stature becomes dwarfed and stunted. Neuralgic pain and weakness are also present, but they are not very prominent features in the case.

It is most essential that a correct **Diagnosis** be made as soon as possible, since so much depends upon treatment started being early. A doctor must be consulted and a thorough examination should be made with the clothes stripped to below the waist, so that the whole back can be seen. The patient should be made to sit straight up on

a stool or chair placed sideways, and the surgeon stands behind her. The general appearance is first noted, and then the bony points of the spine are marked out one after another with a spot of ink or with a flesh pencil. The shape of the thorax, the curvature of the ribs, and the position of the shoulder-blades, are also ascertained. The patient is then made to stand, to hang from a bar, and to bend forwards, and the effects of these respective movements noted; by this means some idea can be obtained of the extent and nature of the deformity. There can be but little risk of mistaking it for Pott's disease, since the

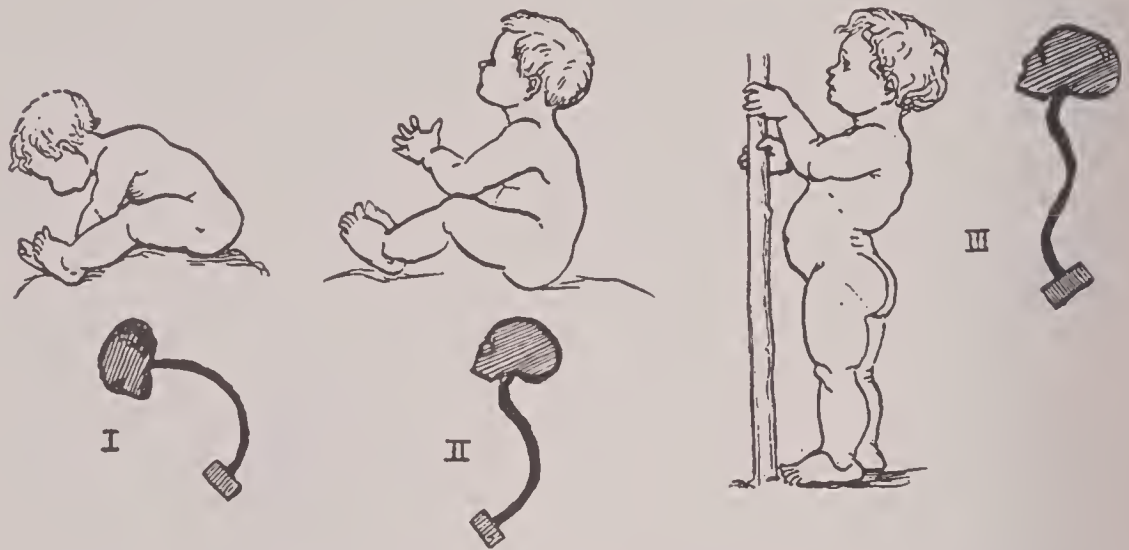


Fig. 288. The natural curves of the backbone. In II is shown the *cervical curve* (in the neck), formed by the raising of the head so that the face is directed forward. III shows the *lumbar curve* (in the small of the back; it is formed when the legs are straightened out in assuming the erect position of standing. These two curves are therefore due to the upright position of the head and body; they are acquired after birth, and are *compensatory and secondary* to two other curves (one in the *thoracic*, the other in the *pelvic* region), which are *congenital* (i. e., exist before birth) and *primary*; these latter two enlarge the bony walls of the two body cavities (thorax and pelvis).

rigidity, deformity, and localized pain of the latter are so characteristic; in those cases of scoliosis, however, where there is a projection of the spinous processes backwards, a mistake might easily arise if only a careless examination were made.

The **Prognosis** necessarily varies with the stage which the affection has reached. In early days, before the deformity has become set, and when it disappears on extension of the spine, it is almost certain to be entirely cured, if suitable precautions are taken. Later on it can be improved to some extent, but in very bad cases all that can be expected is to prevent it from getting worse.

In the **Treatment** of scoliosis, the cause of the trouble must not be overlooked, since in many cases the deformity may be remedied, or at any rate prevented from increasing, by attending to this. Thus,

unequal length of the limbs necessitates the wearing of a high-heeled boot, whilst contractions of the knee or hip joints should, if possible, be remedied. In that variety which occurs in young people from general or local debility, the general health must be improved by a change of air, or the administration of tonics, such as iron and arsenic. Carefully regulated rest and exercise must also be recommended, so as to improve the muscular tone of the back without unduly fatiguing the patient; for a similar reason massage and cold baths are beneficial. All errors of position must be corrected, and suitable desks, forms, and chairs utilized. In the slighter cases it often suffices to order the patient to rest flat on his back on an inclined board for an hour or two daily, the head being thus raised and the spine extended. Calisthenic movements and gymnastic exercises, especially on the horizontal bar and trapeze, are also valuable. Of course, these must be arranged so as to exercise the weak muscles and counteract the deformity. Space forbids describing them here. A spinal support is often useful, but should not be worn too continuously, as it tends to render the muscles of the back weak from disuse.

Kyphosis.—This is a condition of increased dorsal convexity of the back. With it there may be also loss of the lumbar concavity (forward curve in the small of the back), so that the whole spine is bent forwards. Occasionally, however, a marked forward lumbar curvature is present as a compensatory condition.

The chief **varieties** of kyphosis are as follows:

1. Kyphosis from defective growth or habit. This may occur (a) in young people under the age of four, resulting from rickets; (b) in adolescents up to the age of sixteen (round shoulders), from a continuous habit of stooping, as in reading or writing, and is not uncommon in those suffering from myopia (short-sightedness); (c) various forms of occupation, involving the carrying of heavy weights, or stooping over work, will lead to it in adults, as in porters and cobblers, whilst the use of bicycles, which necessitate the riders stooping forwards in order to grasp the handles, is becoming a frequent source of this deformity; (d) in old men it is often met with as a result of the weakening of the muscles of the back.

Treatment is impossible in the majority of cases, but the round shoulders of young people are so common that a little more notice of the condition is needed.

Round Shoulders occur most frequently in girls who have grown rapidly, and perhaps developed precociously. They are often due to bad habits of sitting and standing, especially at school, and may be

induced by faulty desks and chairs, whilst other conditions, such as myopia or adenoids, may also be primarily responsible. The spine becomes bent forwards in the region of the neck and back; and at first the deformity can be voluntarily corrected, but not so later on.

Treatment.—A thorough investigation must be made as to the cause in any case, and all removable conditions dealt with. The most necessary point in the treatment is to increase the power of the muscles of the back, especially those that hold the shoulders back and the back straight. This may be accomplished by massage, electricity, and exercises, the latter necessarily directed towards extension of the back. The girl should never be allowed to fatigue herself unduly, and must rest on her back two or three times a day for half an hour. At night no bolster should be used, the child lying on her back (with a small pillow beneath the curve, if any pillow is used). The general nutrition and health must also be attended to, and a course of suitable tonics prescribed.

Lordosis consists in an increased forward curvature of the spine in the lumbar region. It is usually produced by long-continued flexion of the hip, whether due to congenital displacement, to unreduced dislocation, or to hip disease, and in such cases it can not be cured unless the malposition of the thigh-bone can be corrected.

Deformities of the Fingers.

Congenital Deformities of the Finger are rather common, and the account here given of such defects of the upper extremity applies equally to those which occur in the lower. The following varieties may be alluded to:

Polydactylism consists in the presence of extra fingers and toes, and is often seen. There may be from one to seven additional digits, and the condition is usually symmetrical (that is, occurs on both hands). One case is on record with twelve and thirteen fingers on the hands, and twelve toes on each foot. The extra fingers are often stunted, and smaller in size than the normal, but may be of average dimensions. Usually they are separated from the true digits, but now and then may be blended with them. The correct number of bones in the palm (or in the body of the foot) may be present, or they also may be multiplied. The condition is frequently inherited. The **Treatment** consists in removing the supernumerary digits (extra fingers or toes), if useless, in the way, or troublesome. Sometimes the patients are proud of their abnormality, and refuse to part with

it. A patient with two weak thumbs may sometimes be benefited by uniting them laterally into a single broad one.

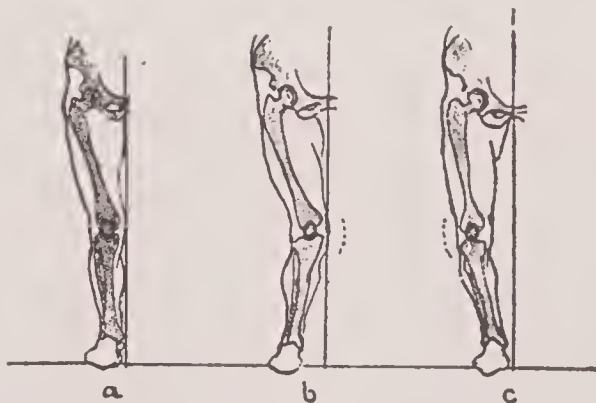
The absence of one or more of the digits is occasionally seen, as also partial arrests of development of fingers or toes.

A congenital overgrowth of one or more fingers or toes also occurs. The structures are perfectly normal in character, and merely gigantic in size for the age of the individual. Amputation may be needed in these cases, as the deformed parts grow out of all proportion to the neighboring tissues.

Webbed Fingers is a condition in which two or more fingers are joined together laterally, either by a thin web consisting mainly of skin, or by a thick fleshy bond of union. In the foot no **treatment** is required, but in the hand the fingers must be separated by a surgical operation.

The term **Mallet Finger** has been applied to a condition in which the last bone of a finger is kept in a state of flexion owing to some damage to the tendon on the back of the finger. It usually follows slight injuries. The **Treatment** consists in the application of an anterior finger-splint in the early stages, but later on, when the deformity is persistent, an operation is necessary.

Fig. 289.
a, The normal shape and position of the leg bones; b, knock-knee; c, bow-leg.



Deformity of the Lower Extremity.

Genu Valgum, or **Knock-knee**, is a deformity in which, if the knees be allowed to touch with the patellæ looking forwards, the ankles are separated one from the other. One or both limbs may be affected, but if due to general causes the double form is more common. Occasionally it occurs in one leg, whilst the other is in a condition of bow-leg.

There are two main **varieties** of the disease, viz.: (1) The rickety knock-knee of young children, and (2) the form occurring in adolescents.

The genu valgum of young children is practically always due to rickets, a disease in which there is a softened condition of the bones. It occurs especially when the child has been allowed to walk or run about too early.

The genu valgum of young people is most common in young people under twenty of relaxed constitution, and particularly in those who, in addition, have to carry heavy weights. Thus, anemic young women who act as nursemaids, and young bricklayers, smiths, and porters are very liable to it.

Occasionally it is due to traumatic causes, such as fracture of the tibia or femur close to the joint, or lateral dislocation of the knee. It is sometimes observed as a result of riding, in those with long legs, as in cavalry soldiers; short-legged individuals, such as jockeys, are more liable to develop a condition of bow-leg.

The following secondary conditions may result from knock-knee, viz.: The feet are displaced outwards, or occasionally inwards, as best suits the convenience of the patient in obtaining as good a foot-



Fig. 290.

A splint to correct knock-knee. The bandage below and the belt above support the splint and draw the knee outward. The same device will do for bow leg if a pad be placed at the side of the knee to press inward.

ing as possible; the bones of the legs and of the thighs are often bent; whilst, if one-sided, the pelvis may be tilted downwards on the affected side, and the spine laterally curved on account of the unnatural shortness of the limb.

In well-marked cases the gait of the patient is very characteristic, since the knees tend to get in the way of each other; hence the term "knock-knee." The legs are kept partially flexed, and as the knees touch or overlap, they have to be separated at each step to allow of progression, and thus a curious rolling sort of walk results.

Treatment.—The surgeon must study each particular case in order to ascertain, not only the cause of the trouble, but also whether or not it has advanced to such a stage as to render useless any treatment but operation. In the early stages of a knock-knee, the bones are still soft and vascular, so that with care and patience the de-

formity may be remedied without having recourse to the knife, and the same treatment is true of the early stages of the other variety.

In rickety infants, therefore, the general condition must be dealt with in accordance with the rules given for the treatment of rickets. A suitable diet should be ordered, cleanliness attended to, and plenty of fresh air allowed. Parrish's food (compound syrup of phosphates) is perhaps the best drug to administer, whilst cod-liver oil is rarely needed, since it tends to increase the body-weight, and so may do harm rather than good. Absolute rest in bed should be enforced; the limbs must be well rubbed daily, and such manipulation and pressure employed as will tend to remedy the deformity and straighten, if possible, the limb. No pain should be caused, and by perseverance slow but appreciable progress may be made until the limbs are straight. In older children, especially when there is some difficulty in keeping them off their feet, it is better to apply splints on the outer side of the limbs, reaching from the pelvis down to the ankle, or, if need be, beyond it. These are retained in position by bandages, put on sufficiently firmly to draw the knees outwards. Such an arrangement is often sufficient in early cases to bring about a cure in the course of a few months.

In the other cases that are not rickety the administration of tonics, such as iron and arsenic, combined with rest, massage, and possibly a change of air, will frequently suffice to cure in the early stages.

When the deformity is somewhat more advanced in either form, more efficient apparatus is needed; that usually employed consists of an outside iron stem, jointed at the knee, fixed below into a slot in the heel of a well-made boot, and attached above to a band around the hips. From it several well-padded straps pass round the limb, and at the knee itself a much broader one covers the projecting inner side of the knee; by tightening these, the limb is drawn outwards towards the rod. The apparatus is somewhat heavy, but if carefully applied for some months may effect a cure.

When, however, the osseous deformity is marked, and the patient of such an age as to preclude the hope of a cure by mechanical means, an operation to cut the bone must be resorted to.

Genu Varum, or **Bow-leg**, is a less common condition, the exact opposite of knock-knee, and what has been said above of the latter is true of the other, if the word "internal" be substituted for "external." Treatment is only required in severe cases.

Genu Recurvatum, or **Back-knee**, is a deformity occasionally met

with in which the joint is over-bent, the limb being curved backward at the knee; it is associated with relaxation or stretching of the ligaments in the knee, and is usually due to a congenital displacement, possibly the result of the limbs not being flexed *in utero*, but extended with the feet under the chin. It is sometimes the result of paralysis of the muscles of that part behind the knee, or may arise from irregular growth, possibly as a sequel of tubercular or other disease of limited extent in that region. It has also been known to occur as an acquired accomplishment in fakirs and contortionists. If treatment is necessary, it must be suited to the special requirements of the individual case.

Talipes, or Club-foot.

Talipes, or Club-foot, is a deformity of the foot due to muscular, ligamentous, or osseous causes, the displacements occurring mainly at the ankle and joints within the body of the foot.



Fig. 291.

Three forms of clubfoot. The deformity should be treated by a surgeon as early as possible.

Causes.—Club-foot may generally be said to result from some derangement in the equilibrium or balance normally maintained between opposing groups of muscles, as a result of which the more powerful group draws the foot into an abnormal position.

Congenital malformation or malposition is responsible for some cases. The congenital variety is often hereditary, and may occur in several members of the same family, or be transmitted through several generations.

The **acquired** varieties are somewhat easier to understand than

the congenital, since they arise from definite injuries, such as: (a) Contraction of muscles, from burns or disease of neighboring bones. (b) Shrinking, resulting from a change of the muscle substance into fibrous tissue, is occasionally met with in elderly people arising from a chronic inflammation, the nature of which is but little understood. (c) Paralysis, due to disease in the spinal cord or brain, is one of the commonest causes of talipes; in young children it is usually due to infantile palsy, whilst a similar affection is occasionally seen in adults. (d) Affections of the main nerve trunks of the leg may also result in club-foot; thus, a nerve may be divided in an accident or operation, or torn in a fracture or dislocation, or compressed by callus or splints, or inflamed. (e) Shortening of the leg from hip or knee mischief may sometimes be the cause, whilst injuries or diseases of one of the leg-bones may stop its growth, and then the continued development of the other bone forces the foot to one side or the other. (f) It is a question whether the condition known as flat-foot, arising from prolonged standing, is to be classed in here. (g) Finally, prolonged maintenance of the foot in a bad position may lead to permanent deformity. The barbarous custom still practised by the Chinese of forcibly compressing the feet of female children brings about a similar result.

The **Treatment** of club-foot is always somewhat tedious, demanding care and patience on the part of all concerned. **In the congenital variety no time should be lost in correcting the deformity**, and, in fact, treatment should commence as soon after birth as possible. The nurse must be instructed to manipulate the limb into a good position, holding it there for some time daily. At the same time the muscles on the offending, that is, lengthened side of the limb should be rubbed and stimulated. In the early stages of the paralytic variety, friction and faradization¹ of the paralyzed muscles must be regularly undertaken. At a somewhat later date treatment by the application of suitable mechanical apparatus may restore the foot to its normal position. If this is unsuccessful, operation is the only recourse left.

Club-foot resulting from hip disease should not, as a rule, be interfered with.

Flat-foot (Splay-foot or Spurious Valgus) is a condition frequently seen in young adults whose occupation exposes them to long standing, over-fatigue, or the carrying of heavy weights; hence it is commonly met with in nurse-girls and shop-boys who have only

¹ *Faradization* is the use of an electric current on muscles.

recently left school, any general deterioration of the health also assisting in the production of the deformity. It occurs as a natural condition in many of the negro races, and is more often seen in long than in short feet.

When the weight of the body increases rapidly, and out of all proportion to the muscular development, this condition may result. However produced, the deformity is tolerably characteristic. The sole of the foot is flat, and in well-marked cases comes in contact with the ground throughout the whole of its extent. The inner border is convex and somewhat lengthened, whilst there is a tendency to the little toe being raised: the outer border of the foot may be slightly raised from the ground. The gait becomes somewhat shuffling, and severe pain may be experienced, not only in the sole, but also in the ball of the foot and in the toes. Sometimes it is extremely marked in the first joint of the great toe, which may be enlarged and rigid, owing to inflammation of the joint and bone. The skin over the inner side of the foot is often thickened, whilst possibly on the outer side it is thinner than usual.

Treatment.—In the earliest stages, when the deformity, though threatening, has not yet actually developed, all that is required in many cases is rest, so as to allow the overstrained muscles and ligaments to recover themselves; at the same time the parts should be well rubbed with stimulating liniments, and tonics taken to improve the general tone of the system. In the next stage, where the deformity, though present on standing, can be made to disappear by manipulation, or on making the patient stand on tiptoe, some slight support is advisable, and probably an indiarubber or cork instep pad worn inside the sock or stocking will be all that is necessary. In addition to this, square-toed boots must be used. It is also wise to walk with the toes turned inwards, and in some cases assistance may be obtained by sitting cross-kneed in the tailor position, so as to exercise a certain amount of constant pressure inwards upon the feet. Regular exercises ought to be practiced, such as raising the body on tiptoe while standing on the outer edge of the foot; such can only be undertaken for a short time at first, but as the muscles regain their tone a longer period can be tolerated. In still worse cases a metal spring or instep-pad may be required; but frequently the tenderness of the sole is so great that it cannot be borne.

When the affection has reached a later stage, and the deformity cannot be remedied by ordinary manipulation, operation is the only cure.

Hallux Valgus consists in a displacement outwards, i. e., to the side of the great toe, as a result of which the other toes are huddled together, and in extreme cases the big toe is placed over or under them. It is present in the majority of people in some measure, owing to the usual shape in which boots are made; but in its severe forms it generally occurs in elderly people. From the fact that it is present in the poor almost as often as amongst rich people, it is evident that it cannot be due entirely to tight-fitting boots, the usually accepted cause. Some derangement of the muscles must also be present. As a result, the bone of the first joint of the big toe becomes exposed beneath the skin, and by the constant irritation of the boot it becomes inflamed, its structure and shape altered, and the joint more or less disordered. Two other conditions are also a result of hallux valgus, viz., bunion and hammer-toe.

A **bunion** consists in the formation of a bursa (or sac) over the side of the first joint of the big toe bone, which becomes inflamed from cold or injury, and may even suppurate, the abscess usually communicating with the joint, and leading to its disorganization. A marked bony outgrowth is usually found under the bursa.

The **Treatment** of hallux valgus in its earliest stages consists in correctly-shaped boots, with the inner border straight from toe to heel. In worse cases an apparatus may be worn, consisting of a band around the foot, to which is attached a support running along its inner border, towards which the great toe can be drawn by elastic tension. In the most severe types an operation to restore the toe to a normal position gives admirable results. Under no circumstances ought the second toe to be removed for this condition, as the lateral support of the great toe is thus weakened, and the deformity is very probably aggravated. An **inflamed bunion** is treated by removing all pressure, and applying warm fomentations. If the joint is suppurating, operation or amputation of the toe may be required. In less serious cases it may suffice merely to remove the thickened bursa.

Hammer-toe.—In this condition the joints of a toe are much bent, so that the first part turns up and the rest of the toe points down. The toe rests on its very end or even on its nail. Corns form upon the joints of pressure (1, 2, and 3), especially on the top bone, and a bursa (or little sac) over the head of the first phalanx (4), giving rise to great pain and inconvenience. The second toe is that most frequently affected, with or without the others, but it is uncommon for the great toe to be thus deformed.

The **Causes** are numerous. It is occasionally congenital, but more

often acquired, and then (a) it may result from hallux valgus; (b) it may result from wearing short and pointed boots, or very high heels; in either case the toes are crowded together and drawn up out of the way of pressure; (c) it follows contraction of the fascia of the sole of the foot, and is then associated with claw-foot; (d) paralysis of the little muscles deep in the foot may also lead to this condition.

Treatment may be commenced by the use of correctly-shaped boots, but, as a rule, the case has progressed to such an extent when the doctor is first seen that no simple measures are of any avail. Operation is then the only cure.

Metatarsalgia, or **Morton's Disease**, is characterized by severe neuralgic pain in the ball of the foot, but also radiating thence up and down the limb. It often occurs in gouty or rheumatic people, and may be attributed to some form of injury; it is frequently associated with a slight degree of flat-foot, but may be due to the wearing of tight boots. The nerves are pinched between the bones and the ground (or sole of the shoe). The foot is usually found to be broader than usual, and large corns are found on the under surface, and one or more of the bones may be unduly prominent. The pain is generally induced by walking, and comes on in characteristic paroxysms. Squeezing the bones in the front of the foot sometimes relieves the pain.

Treatment consists in allowing the foot to rest for some time, whilst suitable diet and drugs are ordered to combat any gouty or rheumatic tendency. At the end of a few weeks the patient may be allowed to walk again, but only with suitable boots, which should be broad anteriorly, and with an instep pad if flat-foot is present.

INSTRUCTION NINETEEN—*Brain and Head*

Subject Reference

For Injuries to the Brain, see pages 119-122.

For Diseases of the Nervous System, see pages 427-456.

Diseases of Brain and Head

Brain Tumors—Abscess of the Brain—Affections of the Face—Affections of the Lips—Cancer of the Lip—Pyorrhea and other Affections of the Head.

Brain Tumors.

The **Symptoms** of a brain tumor are: (1) Those due to increased pressure, such as fixed headache, giddiness, epilepsy, loss of memory, and stupor, finally ending in unconsciousness. The headache varies much in character, but is usually localized, and is often associated with tenderness on deep pressure over the scalp. (2) Vomiting and

constipation are also very marked, associated with loss of appetite and great emaciation. The temperature is usually subnormal, but it may be elevated. (3) Blindness is generally present.

The **Treatment** must be in the hands of a good doctor.

Abscess of the Brain.

Causes.—The most frequent source of brain abscess is chronic disease of the middle ear. Fully 50 per cent of all cases arise from this cause, mechanical injury, penetrating wounds, tuberculosis and general blood-poisoning and other causes.

Symptoms.—If due to infection from outside the body, the case runs an acute course, associated with intense pain in the head, recurrent chills, and rapid development of unconsciousness. General meningitis is often present.

When the case is subacute or chronic, the symptoms are more characteristic. Pain in the head is usually the earliest and most marked of these; at first it is often general, but later on becomes fixed, and localized to the seat of the abscess. It varies greatly in amount, sometimes being of the most agonizing type, sometimes very slight; it is usually continuous, but may be intermittent, and entirely disappear for a time. Loss of appetite, general wretchedness, vomiting, and constipation are often present; the pulse is usually slow and intermittent, and peculiar breathing may occur in the later stages. Epileptic seizures may also be induced. If unrelieved, the patient dies in a state of unconsciousness, from interference with the vital centers in the brain.

Treatment.—Operation as soon as possible.

Affections of the Face.

Eversion of the Eyelids results from: (a) Simple relaxation, either from paralysis or loss of tone of the muscle of the eyelids, or the weight of some tumor growing from the lid; and (b) contraction of the skin of the face following burns or extensive ulceration. The lower lid is chiefly affected, and is drawn down and turned out, so that its conjunctival surface is exposed. It naturally gives rise to escape of tears over the face, and to chronic inflammation of the conjunctiva and possibly also of the cornea, which later on may result in ulceration, or even perforation. The **treatment** calls for some form of operation.

The most common form of **Tumor** of the eyelid is that known

as a **Tarsal Cyst**, which results from distension of a blocked Meibomian gland. (This is not a sty.) A small rounded tumor is readily felt in the substance of the lid, on the conjunctival surface of which a patch of rosy redness is observed. **Treatment** consists in an operation to open the cyst and remove its contents.

Affections of the Lips.

Hare-lip.—By hare-lip is meant a fissure or division of the upper lip. It may extend for a variable distance through the soft tissues alone, or may pass also through the upper jaw and the floor of the nose, and extend backwards through the palate. It is always present from birth (i. e., is congenital).

Varieties.—A hare-lip may be **complete** or **incomplete**, according to whether it extends or not into the nostril. It is termed **simple**, if limited to the soft parts; **alveolar**, if the jaw-bone is also involved; **complicated**, if associated with a cleft palate. The defect may exist on one or both sides of the middle line; if **unilateral** or single, it is most common on the left side, in the proportion of two to one; if double or **bilateral**, it usually, but not invariably, extends through the bone. The nose is deformed, being broad and flattened, a condition which becomes much more marked when the jaw and floor of the nose are widely fissured. Hare-lip is not uncommonly associated with other deformities—e. g., spina bifida and club-foot—and it is frequently transmitted from one generation to another. Occasionally a thin red line, as of a scar, is seen occupying the position of a hare-lip cleft, and is probably due to a persistence of the line of union of the parts of the lip; a slight groove in the jaw may also be observed at a corresponding point.

A simple hare-lip does not interfere seriously with the infant's nutrition, but when associated with a cleft palate, and especially if double, considerable trouble may arise, thus necessitating surgical treatment as a life-saving measure at a very early date. It must also be remembered that all movements of the face—e. g., in crying or laughing—exaggerate the deformity from the unbalanced action of the muscles.

As to the **period** at which to operate, much discussion has arisen. It is better, however, to allow the infant to get over the shock of entrance into the world, and become acclimatized to an independent existence, but the operation should be performed before the troubles of teething begin. From six weeks to three months is perhaps the

best period to undertake treatment—in well-nourished and healthy children at the earlier date, in poorly-fed and weakly children at the later, unless the poor condition be due to the difficulty of giving nutrition owing to the deformity. Under such circumstances the operation may have to be undertaken within the first three weeks.

Syphilitic Affections of the lip are not uncommon. A **primary chancre** may be caused by kissing, or by smoking a pipe, or drinking from a glass which has been used by a person with syphilis. It usually presents a smooth ulcerated surface, discharging a small amount of watery pus. An enlargement of one or more of the submaxillary lymphatic glands occurs very early, and the disease usually runs an acute course. Ordinary treatment for syphilis is all that is needed. A chancre on the lip may very closely resemble epithelioma (a kind of cancer), but is distinguished from it by its rapid development up to a certain point, by the early swelling of the glands, which soon become very large, by the absence of the body condition typical of cancer, by the age of the patient; and the course taken by the case, whilst the local appearances are not strictly those of epithelioma.

Cracked Lips (or, as they are often called, **chapped lips**) are usually the result of cold weather, a central crack or fissure forming which is extremely painful, and liable to bleed very readily on stretching the part, as in smiling. The lower lip is that generally affected. In tubercular children more than one may occur, and may tend to persist, giving rise to a considerable degree of hardening and swelling, and perhaps leading to trouble in the lymphatic glands.

Treatment consists in the application of a little lanoline or cold cream, but if they persist, it may be advisable to touch them with nitrate of silver.

‘Cold Sore’ on the Lips.

Herpes Labialis is a condition usually associated with catarrh, and not unfrequently with pneumonia or other fevers. Either lip may be affected, and the eruption is, as a rule, quite limited in extent. It consists of a number of little vesicles situated on a red and painful base; after a few days the vesicles become transformed into pustules, and these in turn burst and dry up, the whole affection lasting perhaps a week or ten days. No special treatment is called for.

Warty Growths are often seen on the lower lip, especially near the corners of the mouth, and may then look like epithelioma. They are distinguished, however, by the fact that ulceration is not often

present, that the lymphatic glands are not involved, and that there is but little thickening of the skin around. They should, however, be removed as early as possible, since cancer often starts from them.

Epithelioma (cancer) of the lip usually occurs in men of the working classes, and is commonly stated to be due to the irritation produced by smoking a short clay pipe, which is allowed to rest on one or the other side near the angle of the mouth. A semicircular notch will frequently be noticed in the teeth of the upper and lower jaw, corresponding to the situation of the growth on the lip, and caused by the constant friction of the pipe-stem. It may also start opposite the site of some projecting rough or decayed tooth. It is but rarely met with in women. It has been observed to be more common amongst country folk who use the short clay pipe than amongst the cigarette and cigar smokers in towns.

The disease may start as an hardening around a crack or fissure, which gradually extends, forming a typical malignant ulcer; or as a wart-like growth, which grows up and ulcerates; or as a chronic irregular thickening of the lip.

If allowed to run its course unchecked by treatment, the disease steadily progresses, forming an ulcerated mass of greater or less size, and even involving the jaw. The glands below the skin and under the side of the jaw are early affected. Beyond this, however, the disease rarely extends, internal complications being uncommon. When a fatal issue results, it is generally caused by the secondary growths in the neck, which attain considerable dimensions and then ulcerate. From these ulcerated surfaces a variable amount of discharge occurs.

The **Diagnosis** is rarely doubtful, but occasionally warty growths, or even a syphilitic chancre, may be mistaken for it. The history, as a rule, suffices to determine the nature of the mass, as also the character of the skin around it and the appearance of the parts.

Treatment.—The primary growth can almost always be cut out completely without much difficulty; if glands are also enlarged, these should be removed.

Affections of the Gums and Jaw Bones.

Spongy Gums are not unfrequently met with as a result of the administration of mercury, or from scurvy. They are characterized by being soft and congested, bleeding readily on pressure, and perhaps showing signs of ulceration. All that is necessary is the correction of the cause and the use of an alum gargle.

Alveolar Abscess ("Ulcerated Tooth") is almost always associated

with suppuration around the fang of a decayed tooth. If limited in extent, it perforates the gum directly, and is then known as a "gum-boil;" but it occasionally burrows beneath the periosteum, which is stripped from the bone, and may thus lead to an abscess of larger size, possibly resulting in necrosis of the jaw. There is always much pain (toothache), which when extensive may give rise to serious constitutional disturbance. Occasionally graver complications may ensue; thus, in the upper jaw the antrum (hollow in the upper jaw bone) may be opened, and suppuration in this cavity may follow, whilst in the lower the abscess may travel downwards and burst externally, either close to the lower margin of the bone or in the neck. A troublesome sinus results, which can only be cured by the removal of the tooth, and even then a depressed and adherent scar ensues, which is extremely unsightly. The most essential point in the **treatment** necessarily consists in the removal of the offending tooth. This should not be done till the abscess is cured and sinus filled up. Possibly the tooth may come away with an abscess cavity attached to one of the fangs. (See "Toothache" for full treatment.)

Pyorrhœa Alveolaris (or **Rigg's Disease**) consists in an inflamed condition of the margins of the gums, accompanied by a discharge of thick pus and the gradual loosening and loss of the teeth, so that after a while the patient is likely to become toothless. Occasionally the process is limited to a few teeth, but is almost always associated with excessive deposit of tartar around them. Nothing definite is known as to its nature or causation. All that can be done consists in the removal of tartar and the application of astringents and antiseptics.

Affections of the Antrum (Hollow in the Upper Jaw under the Eye).

Suppuration of the Antrum frequently arises from disease connected with the fangs of the first or second molar or bicuspid teeth; it not uncommonly extends from the nose and is occasionally set up by injury.

The **Symptoms** produced are often extremely puzzling, and the condition may be present for some time without being recognized. In the **chronic** forms there is usually a little tenderness over the cheek, and perhaps some swelling of the lining or of the cheek, whilst there is an intermittent discharge of pus into and from the nose. This varies considerably in amount and character, being sometimes extremely offensive. Although the patient notices the bad odor himself, it is not, as a rule, discerned by other people, thus differing from ozæna. On holding the patient's head forwards, it can be demon-

strated that there is an overflow of pus into the nostril, and sometimes when the patient lies on his back it flows back into the pharynx. Should the opening into the nose become blocked, all the symptoms are aggravated, the pain becoming more marked and the swelling increasing. **Signs of distension** of the cavity may also be produced in this way; such may be manifested in four directions: (a) Inwards, causing obstruction to nasal respiration, and possibly flow of tears down the cheek, from compression of the nasal duct; (b) upwards, leading to protrusion of the eyeball; (c) downwards, resulting in depression of the side of the palate, and possibly irregularity in the line of the teeth; and (d) outwards, giving rise to a somewhat characteristic projection of the cheek. Under these circumstances, a finger inserted into the mouth, between the cheek and the bone (i. e., under or inside the cheek), will detect a loss of resistance in the anterior wall of the antrum, and if the distension has lasted long, crackling like crushing an eggshell may be felt.

In **acute** cases all the above symptoms may be present in an accentuated degree, accompanied by severe pain and some amount of fever.

The **Diagnosis** of suppuration within the antrum is by no means readily made, since there are many conditions which simulate it somewhat closely. Perhaps the most important sign is the periodic discharge of pus from the nose, and if this can be induced by change of position of the head, it is almost a sure sign. A dead or painful first molar or bicuspid is also most suggestive of this condition. Another method which has been recommended is that known as **transillumination of the antrum**. A small electric lamp is placed within the mouth, and if the patient is in a dark room the cheeks, lips, and lower margins of the orbits become of a rosy-red color. If, however, the cavities are occupied by pus, blood, or a growth, the parts remain dark.

The **Treatment** of this affection consists in a simple surgical operation, freely opening the antrum from the mouth, so that the cavity may be washed out and drained.

Examination of the Nose and Naso-Pharynx.—In order to understand fully the diseases of the nose, the interior of the organ must be efficiently examined, and to do this three chief methods are resorted to:

1. **Anterior rhinoscopy** consists in the illumination of the front of the nasal cavity through the anterior nares (nostrils). A good light

is required, such as that derived from an electric head-lamp, and some form of nasal speculum, or device to open the nostril widely.

2. By **posterior rhinoscopy** is meant an examination of the posterior nares (openings of the nose into the throat) by a mirror placed in the throat behind the soft palate. It is by no means easy to accomplish, and requires some dexterity and practice.

3. **Palpation of the posterior nares**, with the index finger, previously well washed, will, however, give better results in the majority of cases to those who are not specially practised in the above method. The index finger is passed behind the uvula and soft palate, and the nares can then be well explored, and the existence of adenoids or other growths determined.

Foreign Bodies are rarely lodged in the nasal passages except in children, in whom the condition is not uncommon. Any pus discharge from one side only of a child's nose should suggest the likelihood of such an occurrence, peas, beads, or buttons being the substances usually introduced. A certain amount of obstruction to breathing through the nose is caused thereby, followed by a catarrhal or even suppurative inflammation of the nose. As a rule, removal is readily effected by syringing out through the unaffected nostril, the lotion rushing back through the other side, and carrying the intruding body before it. A simple plan is to make the child sneeze with snuff or by shaking out a little pepper near him.

Ozena (Bad Odor of the Nose).—This term was formerly applied to any offensive mucopurulent discharge from the nostrils, whatever the cause. It is now, however, limited to one particular affection, and that a special form of dry inflammation of the nose.

The disease is usually met with in young females, and may sometimes originate from some injury, or after one of the rashes, or is associated with inherited tuberculosis or syphilis. The nose is almost always wide and roomy; the lips are often thick and projecting, or rolled out, and the mouth is usually held open owing to the impediment to nasal respiration caused by dried mucus. The fœtor (bad odor) of the breath is the special feature that calls attention to the complaint; it is peculiarly searching and objectionable, but the patient fortunately is not usually aware of it. It is due to the decomposition of the muco-pus collecting in the nose. There is not much discharge, but at varying periods large crusts come away, giving relief both to the nasal respiration and to the fœtor. Both nostrils are usually involved alike.

On examination, the shape and size of the nares are the first

things that claim attention; hairs in the nose are apt to be scanty, and on inserting a speculum the unusual openness and space become evident; in fact, after clearing away all the dried mucus and scabs, it may be easily possible to see the posterior wall of the throat through the nose. The mucous membrane lining the nose is dry, collapsed, and pale, and crusts may be found covering any or every part of it. The throat is also dry, and may be coated with a film of dried mucus. No ulceration is, as a rule, present, although the removal of the crusts may cause a slight amount of bleeding owing to their close attachment to the mucous membrane.

Ozena is never seen in patients with narrow nostrils, and is almost always associated with wide, roomy noses. In consequence, it is difficult to obtain sufficient air pressure within them to expel the discharge arising from any ordinary inflammation of the nose (that is, it is hard to clear the nose out by blowing it), and hence the discharge tends to collect and to putrefy. The irritation thus induced is likely in weakly children to lead to suppuration. It is always a prolonged process, although in the course of years it tends to improve and gradually disappears.*

Treatment.—The first essential is to keep the nose clean and free from putrefying masses of dried secretion. This must be done by irrigating the cavity once or twice daily, and preferably with warm water, to which a little alkali, such as common soda, and an unirritating antiseptic, such as sanitas, borolyptol, listerine or glyco-thymoline, has been added. A very good remedy is table salt one part, baking soda one part and granulated sugar two parts. A teaspoonful should be dissolved in warm water and used to wash out the nose. At first it is well for the surgeon to see to this himself, but after a while the patient or her friends can be entrusted with the task. Every portion of scab ought to be removed daily, and the surface lubricated with some such application as a spray of menthol and paroleine (10 grains to 1 ounce). The nose should then be partially plugged with cotton-wool, especially along the lower part or floor, and if thought desirable the wool may be medicated with some antiseptic. By this means a flow of mucus from the membrane is set up, and the discharge is thus rendered more fluid, and drying prevented. A similar result may also be obtained by partially plugging the nostril with an india rubber tube, so as to diminish its size. The general health must be attended to, and as a rule patience and perseverance will at length be crowned with success. Operative measures are scarcely

ever called for in this disease, although they have frequently been resorted to most unnecessarily.

Nasal Polypi.—Two forms of nasal polypus occur, viz., the harmless or mucous polyp and the malignant fibrous or fibro-sarcomatous. (Other malignant tumors occur in the nose, to which, however, the term polypus can scarcely be extended; they mainly originate from the upper jaw.)

The **mucous polypus** consists of a soft gelatinous mass. The polypoid masses are generally several in number, a large one projecting downwards and forwards towards the nostril, and covering or hiding a whole series of smaller ones, which readily spring into prominence when that in front is removed. They are sometimes due to, and kept up by, suppuration in one of the adjacent sinuses (or spaces in the bones about the nose). They are usually attached by but a small pedicle, and in shape they are pyriform, and laterally compressed, owing to the narrow space in which they develop. When of large size, they may protrude through the nostrils. Sometimes they project backwards into the pharynx, and are more distinctly globular and usually single.

The main **symptom** arising from nasal polypi is obstruction to the passage of air along one or both sides of the nose, according to the location of the growths. This is always gradual in coming on, and is invariably worse in wet weather. There is often a watery or ropy discharge from the nose, which may perhaps be blood-stained. The patient is unable to blow the nose, and his voice becomes nasal in quality. When of large size, some flattening or expansion of the bridge of the nose may be caused thereby, and possibly the end of the canal that carries the tears from the eye to the nose may be pressed on and blocked so that the tears flow over the cheek.

The **treatment** of mucous polypi consists in their removal by an operation, either by forceps or the snare. Whichever method be adopted, recurrences are not uncommon, and the treatment may in consequence be very prolonged.

A **fibrous polypus** is a fibroma or hard tumor, which tends sooner or later to become sarcomatous. It arises from the base of the skull. It is at first suspended on a stem, and is usually firm, smooth, and fleshy in character; when of large size, it may be irregular. The early symptoms are almost limited to obstruction of nasal respiration, but to this is not infrequently added severe nose-bleed. As it increases in size, ulceration occurs, leading to a foetid bloody discharge, and the growth rarely remains limited to the nose.

The disease usually attacks young people, and mainly those in the second decade of life (10 to 20). It progresses with considerable rapidity, and is fatal.

Treatment.—Unfortunately this condition is but rarely recognized in the early stages, owing to the fact that the majority of practitioners are quite unable to use the rhinoscope. Immediate operation is the only cure. The longer before it is removed the greater the amount of tissue that has to be taken away.

Adenoids.—A large proportion of children and young people are subject to this condition in a more or less aggravated form. Adenoids are very common in children with an inherited tubercular history, and are of considerable importance from the results to which they give rise.

Adenoids are a large mass of soft flesh in the upper part of the throat, behind the nose. The tonsils are often enlarged at the same time. They may occur in the form of broad cushion-like masses springing mainly from the roof or posterior walls of the throat or occasionally as suspended tumors hanging down into the posterior nares. The tumors are extremely soft and vascular, bleeding very readily.

The **symptoms** of adenoids are mainly due to obstruction to breathing through the nose. The **mouth is generally held half open**, so as to allow the patient to breathe through it, and for a similar cause he **snore**s during sleep, and usually wakes with the mouth and tongue dry. The nostrils are drawn in, and **the nose thin and pinched**, the whole aspect being very characteristic; the children often look half silly, and indeed may be very **backward in their studies**. Not uncommonly there is a certain amount of discharge from the nose, or it may be hawked up from the throat, perhaps mixed with blood. **Deafness** also results from a spread of the catarrhal condition to the ear, and both taste and smell may be poor. In bad cases which have been allowed to persist throughout youth considerable deformity of the chest is induced, owing to the inability of the child to take a really deep inspiration, the ribs in consequence being drawn in. The palate also becomes high and arched, and if the patient grows up, the teeth may project forward, giving a curious rabbit-like expression to the face. The glands in the neck are often enlarged, and may be the seat of tubercular disease.

Physical examination consists in posterior rhinoscopy (see beginning of this chapter) by means of which the growths can be seen, or in feeling the back of the nose with the finger in the throat, a process

more suitable to children, who rarely will permit the former. On passing the finger behind the soft palate, the naso-pharynx is found to be occupied by a soft mass which readily bleeds, and more or less obstructs the openings of the nose into the throat.

Treatment consists in the great majority of cases in removal of the adenoids by operation. If left alone, there is a tendency for these growths to gradually disappear, but during this interval the development of the child may be considerably hindered, and hence a cure by natural processes in children should never be relied on. In young adults, however, attention to the general health, combined with irrigation of the nose with salt and water, and perhaps the local application of a weak solution of nitrate of silver (5 grains to 1 ounce) to the naso-pharynx, may suffice to bring about an improvement of the condition.

Epistaxis (Nose-Bleed) may arise from a variety of causes, including blows or injury, or from the presence of ulceration or tumors. Some of these local causes are very evident, if only they are carefully looked for. One of the commonest lesions is a small abrasion or ulcer of the septum, due to detaching by the finger a scab or dried crust of mucus which causes irritation within the nostril; each time the nose is "picked" in this way, bleeding recurs. Another frequent cause of nose-bleed is the rupture of a varicose vein in the mucous membrane of the septum; such veins are common in plethoric or full-blooded individuals, and sneezing or blowing the nose violently may lead to an attack of nose-bleed. Foreign bodies may also cause it, or ulceration. It frequently occurs in young people about puberty in consequence of local disturbance in the vascular arrangement of the parts; again, cerebral congestion may induce it, owing to the communication by means of veins between the interior of the skull and the nose; excessive changes in the atmospheric pressure, as in mountaineering, may lead to epistaxis, while in abnormal states of the blood it may occur with hemorrhage elsewhere. One or both nostrils may be the seat of the bleeding, and it may be so excessive as even to threaten life.

Treatment.—It must not be forgotten that, in the majority of cases, there is some local cause of nose-bleed which can be found and treated directly—a fact which once more emphasizes the necessity for every doctor's gaining a mastery over the use of the rhinoscope. The bleeding is generally on one side only, and in nine cases out of ten the source is within easy reach of the nostril, and hence in many

instances all that is required is to grasp the nostrils firmly, and thus allow the blood to collect within, and give it an opportunity of clotting. At the same time, the patient should sit up, and cold may be applied to the root of the nose, or to the nape of the neck. Failing these measures, the nostrils may need to be plugged.

INSTRUCTION TWENTY—*Mouth, Throat, Etc.*

Subject Reference

For Cancerous Growths, Tumors and Cysts, see pages 60-72.

For Cancer of the Breast, see pages 173-182.

For Cancer of Lip, see page 615; Bowel, see page 195; Rectum, see page 213; Bladder, see page 223; Stomach, see page 404.

Cancer and Goitre *and other Affections of the Mouth, Throat and Gullet*

Stomatitis, or inflammation of the mucous membrane of the mouth, is by no means uncommon, especially in children.

1. **Simple Catarrhal Stomatitis** results from mechanical irritants, such as roughened teeth, or from irritating chemicals. It may also arise in the course of fevers, and in conditions of debility such as follow measles and other rashes in children; or be associated with disturbances in the alimentary canal, as by improper feeding, dyspepsia, etc. The mucous membrane becomes red and swollen, usually in small patches, which may gradually spread and join together, involving nearly the whole of the mouth. The mucus in the mouth is increased, and becomes thick and loses its clearness, while the surface layer of cells, at first white and sodden, is after a while rubbed off, leaving superficial bare spots or distinct ulcers, which are very painful. The **treatment** consists in the removal of all sources of irritation, and the administration of drugs for the intestinal derangements. Chlorate of potash, possibly combined with dilute hydrochloric acid, is exceedingly useful, both locally and internally. In the more severe cases antiseptic mouth-washes should be employed, such as glyco-thymoline, sanitas (1 in 10), boro-glyceride (1 in 20), etc.

2. **Aphthous Stomatitis** occurs in badly fed children, in the form of small whitish spots on a red spot, which run together, and produce ulceration. Attention to the general condition, and the local application of a little borax and honey or a solution of boro-glyceride (1 in 20) is all that is needed.

3. **Thrush** is a very similar condition (see index).

Affections of the Tongue.

Congenital Abnormalities of the tongue are met with in the following forms: (a) The tongue is occasionally entirely absent. (b) **Tongue-tie** is said to be present when the frænum (or web under the middle of the tongue) is shorter than usual, causing the tip to be depressed and fixed in the floor of the mouth so that the tongue cannot be put out. Sucking becomes difficult in such cases, and when it is allowed to persist, there is often a lisp in the speech. Treatment is by an operation, only needed in the severer forms.

Wounds of the tongue are often caused by the teeth, especially during an epileptic seizure, or in children as a result of falls with the tongue out. There is usually brisk bleeding for a few moments, which soon ceases, though blood may escape into its substance, and cause considerable swelling. In simple cases the wound should be examined and purified, and the mouth constantly cleansed with mild antiseptic lotions.

Poisoned wounds of the tongue from the sting of a wasp or bee cause rapid swelling, which may extend backwards, leading to possibly fatal suffocation unless relieved by the doctor opening the wind-pipe.

Ulceration of the tongue may arise from a variety of causes, and occurs in many different forms. The **irritable** ulcers arise from rough and decayed teeth. **Dyspeptic** ulcers are associated with disturbances in the stomach; they are usually located on the middle of the upper surface, and are often very painful. It is sufficient to touch them with lunar caustic after dealing with the cause.

Cancer of the Tongue is both a frequent and a very fatal disease. It is usually met with in men, and may arise as a result of the irritation caused by excessive smoking, especially of cigars, cigarettes, or foul pipes.

Its onset or beginning varies somewhat according to the situation: (a) It arises most commonly as an ulcer at the margin of the tongue, towards the junction of the middle and posterior thirds, and is then probably due to the irritation caused by ragged and irregular teeth; (b) it may start in a crack, fissure, or scar on the upper surface of the tongue, as a result of chronic superficial inflammation; (c) it may commence as a wart-like growth, invading the muscular substance, and spreading to the root of the tongue; (d) it may originate as an ingrowth from the mucous membrane, without much external manifestation of its presence; (e) it may first be noticed

as an irregular ulcer in the floor of the mouth; or (f) it may spread into the tongue from surrounding parts, such as the tonsils.

In whatever way it commences, the same features are soon manifested, viz., a new growth is noticed, hard in consistence, indefinite in its extent, which may or may not be painful from the first, and which ulcerates superficially, exposing a more or less cupped-out cavity, with a gray, sloughy, foul surface, readily bleeding when touched, and discharging a foul secretion, which causes extreme bad odor of the breath. The ulcer is surrounded by a hard mass, which gradually shelves off into the neighboring healthy structures, or may be abruptly limited. Profuse saliva is produced by the irritation and all the movements of the tongue are painful and limited, so that both swallowing and speech are difficult, the patient allowing the saliva to dribble out of his mouth. The pain is often very excessive, and usually extends especially to the ear, so that sleep becomes impossible, and the patient's condition steadily and rapidly gets worse. The glands under the chin and at the angle of the jaw early become involved in the disease. The patient rarely lasts, apart from treatment, for more than twelve months after the disease has been first noticed.

Diagnosis.—When an ulcer is situated at the side or base of the tongue in a patient over forty-five years of age, with the typical enlargement of the glands, profuse saliva, and impaired movements of the tongue, there can be little doubt as to the disease being cancer. But when it is seen in the early stage, it may be exceedingly difficult to determine whether or not cancer is present.

Treatment.—The only hope of curing the patient lies in thorough and early removal of the growth, which, it must be remembered, has probably extended much further than one expects. Hence, no half-measures should be adopted, but complete operations are advisable.

Affections of the Salivary Glands.

Inflammation of the Parotid Gland (in front of and below the ear) is met with in several different forms.

Mumps is an acute specific disease, usually seen in children, highly infectious in character, and generally epidemic. The period of incubation is about three weeks, and the attack itself is evidenced by a slight fever, with swelling of one or both parotid glands (in front of and below the ear); one side is attacked first, becoming enlarged and tender, the swelling beginning to diminish about the fourth day,

when the other side is similarly affected. Mastication (chewing) becomes difficult, owing to the tension of the parts. The swelling extends below and in front of the ear; the neighboring lymphatic glands are also sometimes enlarged. All that is needed in treatment is to keep the patient warm and quiet, and to give salts to keep the bowels freely open. In the later stages rubbing the swollen jaw with stimulating liniments will hasten resolution. After the acute attack, the gland may remain enlarged for some time.

Tumors of the Salivary Glands are either single or malignant. Any swelling that lasts some weeks should be shown to a doctor and if necessary an operation had for the removal of the tumor.

Affections of the Palate.

Cleft Palate.—Cleft palate is a congenital defect of the roof of the mouth; the structures entering into its formation do not unite in the middle line, thus allowing an abnormal communication between the nose and mouth. The mildest cases consist merely of a split uvula, perhaps not involving the palate at all; the next degree of severity

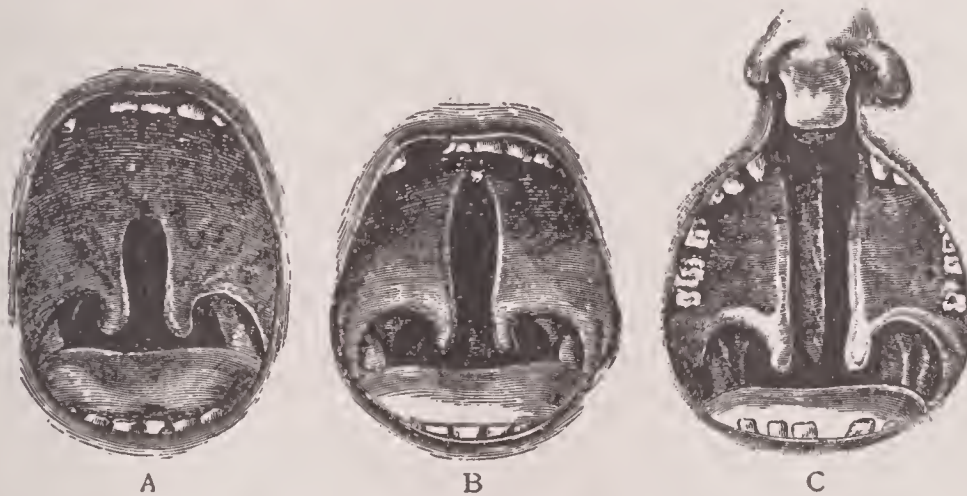


Fig. 292.

A, cleft palate. B, more extensive cleft palate. C, cleft palate and harelip—double.

affects the soft palate alone; more or less of the hard palate may also be divided; whilst the severest forms of the deformity extend in addition through the upper jaw and upper lip on one or both sides.

The **width** of the cleft and the slope of the segments varies greatly in different cases. The wider the cleft, the more unfavorable it is for treatment by operative means.

The **effect** of such a deformity upon the infant is very serious. **Nutrition** is considerably impaired, owing to the fact that the power

of suction is lacking, and fluids taken into the mouth are apt to escape through the nostrils instead of being swallowed. Consequently these children must be carefully spoon-fed, otherwise they become emaciated and die. If they grow up, **articulation** becomes so indistinct that it is often impossible to understand what they say, the voice having a peculiar and characteristic intonation. All the letters known as explosives, whether dentals, labials, or gutturals, requiring a certain amount of air-pressure within the mouth for their due pronunciation, are difficult to produce, particularly **b, d, p, t, g, f**, etc. Moreover, the exposure of the interior of the nose to the air is so much greater than usual that it is exceedingly liable to catarrhal inflammation, resulting in scabbing, which, undergoing putrefactive changes, leads to a sort of ozena. Both taste and smell are much diminished, partly from the unhealthy state of the mucous membrane, and also from the absence of surface against which the food can be pressed by the tongue. The **moral** effect of this deformity, particularly when associated with hare-lip, is such as to cause the patients to shun publicity from a nervous feeling of self-consciousness.

As to the best **period** at which to operate, considerable divergence of opinion exists. There are some surgeons who advocate its performance at as early a date as possible, and, in fact, it has been undertaken when the child was but a few days old. After an extended experience, it may be stated that the operation may best be undertaken between the second and the third year, an age at which the child can more easily be kept under control. It is most important that the general health be good, and the mouth and throat free from local disease or inflammation.

Results.—In every case it is possible that articulation will be, if anything, impaired as the immediate result of the operation, since the mechanism which the patient ordinarily employs is thrown out of gear; subsequent education by a voice-trainer is absolutely essential in order to correct this. Even then occasionally the unpleasant articulation may persist, owing to the patient being unable to draw up the soft palate so as to close the posterior nares (opening of the nose into the throat); this is due to the raising of the soft palate by the traction required to close the cleft. In spite of this, however, the operation is most beneficial in that it shuts off the nose from the mouth, prevents the dropping of mucus, improves the sense of taste, and adds greatly to the general comfort of the patient.

Elongation of the Uvula is frequently the result of a chronic relaxed throat. At first it merely lasts for a time, and by the use of

astringents disappears; but later on the elongation becomes chronic, and causes great irritation of the back of the tongue and fauces, resulting in a troublesome throat-cough, and possibly even vomiting. Under such circumstances part of it should be removed by a simple operation.

Foreign Bodies not unfrequently lodge in the gullet, especially in children and lunatics. Portions of food, coins, fish-bones, pins, plates of false teeth, etc., are the substances usually sticking in the throat. The patient complains that something has lodged in the gullet, causing a feeling of pain and distension; whilst swallowing is painful or impossible, and respiration may be more or less hampered. Large bodies are often lodged at the entrance to the gullet, and then cause sudden death from suffocation; if the obstruction is not so great, and remains unrelieved, swelling of the glottis may supervene. Lodgment lower down is likely to be followed by ulceration, perforation, and death. In some cases, however (about 50 per cent), the foreign body will spontaneously pass either into the mouth or stomach.

The **Treatment** varies much according to the nature, size, and situation of the obstructing body. If small, it may be carried down into the stomach by having the patient swallow a mouthful of bread. If it can not be reached with the finger a doctor should be called at once. If it is impossible to draw it up, it may sometimes be pushed down into the stomach. Skiagraphy (X-rays) may be usefully employed to assist in the localization of metallic substances such as coins, as also to determine whether or not they have been dislodged, and may even be utilized to assist in the removal.

When once the foreign body has passed into the stomach, purgatives and emetics should be avoided, and if not of large size and irregular shape, the case is left to Nature. The patient is kept quiet, and fed with plenty of pultaceous food—such as brown bread, porridge, etc.—and the motions are carefully examined. Should, however, the foreign body be large, and the gastric symptoms persist, it should be removed by opening the stomach.

Spasm of the Œsophagus, or hysterical stricture, arises in “nervous” young women usually under twenty-five years of age, and is often associated with some slight scratch or ulceration of the mucous membrane, perhaps due to the lodging at an earlier date of a fish-bone. The symptoms complained of are difficulty in swallowing, and a sensation as of a ball arising in the throat (**globus hystericus**),

due to a spasmodic action of the muscles. At times, when the patient's attention is diverted, swallowing occurs quite normally. The best course of **treatment** to adopt is cold douches to the spine, massage, the administration of purgatives, valerian, etc.

Stricture of the Œsophagus occurs in two forms—the fibrous and the malignant:

1. **Fibrous Stricture of the Œsophagus** is usually located near its commencement, and is most frequently caused by the swallowing of corrosives, and the scars caused thereby; it also results from syphilitic disease. At the lower end it may arise from the healing and contraction of a stomach ulcer. The main **symptom** produced is a gradually increasing difficulty in the swallowing, firstly of solids, but finally even of fluids. If the obstruction is placed at the upper end of the tube, food is returned immediately; but if lower down, the œsophagus may become dilated, and in this pouch the food may collect for a time, and then be returned unchanged. There is but little pain in this form of stricture, although the patient is usually able to indicate the level of the obstruction. As the case progresses, he becomes steadily emaciated from sheer starvation, and may even die from this cause.

2. **Malignant Stricture of the Œsophagus** is due to cancer and occurs in subjects over forty years of age. It is situated either at the beginning or in the middle of the tube, or at the lower end at the stomach. The growth sooner or later ulcerates, perhaps perforating the trachea, pleural cavity, or one of the large vessels. Secondary deposits occur in the lymphatic glands, either of the neck or chest, complications in the internal organs being uncommon. The **symptoms** are similar in character to those of fibrous stricture detailed above, but in addition the vomited materials may contain blood, and there is a good deal of pain usually at the site of the disease. Should the growth be at the upper end of the tube, a tumor may be distinctly felt, placed deeply in the neck and more marked on the left side; in the earlier stages nothing can be felt externally, although the side-to-side movements of the larynx may be impeded. Perforation of the trachea leads to the entrance of food into the air-passages, and rapidly results in pneumonia and death. When the upper part of the gullet is affected, the growth may spread to the back of the larynx, and cause hoarseness and even loss of voice.

Treatment of Stricture of the Œsophagus.—This can be carried out only by a doctor.

Diseases of the Thyroid Body.

Goitre.—Enlargement of the thyroid body, or, as it is termed, bronchocele or goitre, is a condition frequently seen, and to which much attention has been directed of recent years, owing to the discovery that the thyroid body exercises considerable influence over the well-being of the body.

The **Causes** are still very uncertain. The disease occurs especially frequent in the hilly parts of Derbyshire and Gloucestershire (being also known, in fact, as Derbyshire neck), whilst it is also exceedingly common in Switzerland. The old idea that it occurs more frequently in places located on chalk or magnesian limestone is not true. Possibly the disease is due to the presence or absence of some mineral constituent of the drinking water, and the recent discovery made by Baumann, of Friburg, suggests that an absence of iodine is the cause of the trouble. At any rate, iodine is to be found in the normal secretion of the gland in question, whilst it is absent in cases of goitre. Other causes which have been suggested are want of sunshine and air, as in the case of individuals who live in valleys into which the air does not readily penetrate, or in the underground kitchens and cellars of large towns, defective sanitary conditions, and the habit of carrying weights upon the head, also possibly assisting. In the form ordinarily met with, it is not hereditary, and is not influenced by intermarriage; but it may be congenital, and if associated with changes in the bones, defective growth, and intellectual weakness, constituting the condition known as cretinism, it certainly runs in families. The ordinary type of goitre seen in this country is much more common in women than in men.

General Features.—In all these cases the thyroid body is enlarged. Its consistence varies with the nature of the growth, but it always moves with the larynx on swallowing. In every form there is probably a certain amount of anemia, whilst some of the symptoms characteristic of the exophthalmic variety are often produced even in simple cases, possibly from the excessive absorption of thyroid secretion. There may be harshness or loss of the voice as well as difficulty of swallowing food.

Treatment.—In the early stages palliative measures can be employed, consisting in the improvement of the general health and improving the personal and sanitary hygiene. Change of air to the seaside is often advisable, whilst iron and iodide of potassium may be administered internally, and iodine paint or iodide of potassium

ointment applied locally. In India cures are often produced by rubbing in iodide of mercury ointment, the part being subsequently exposed to the rays of the mid-day sun; such treatment is generally impracticable in this country. The deficient amount of iodine present in the gland in these cases explains why this drug is so pre-eminently useful, and it has been found that the extract of the gland called "thyro-iodine" is the best form in which it can be administered. The internal administration of thyroid extract is sometimes followed by a diminution of a simple goitre, and the same explanation of its value probably holds good.

Exophthalmic Goitre, or, as it is often termed, Graves' or Basedow's disease, is a condition with a diffuse enlargement of the thyroid body, which often pulsates forcibly owing to the dilatation of the vessels, associated with marked anemia, severe palpitation and easily excited, rapid heart action and protrusion of the eyeball (exophthalmos or proptosis). In cases where thyroid extract has been given to excess symptoms somewhat akin to those seen in this condition have arisen. It has been suggested that the disease is due to the excessive thyroid secretion, although why it occurs in some cases of enlargement, and not in others, has not been explained. In all probability the truth is that there is a change in the nervous system which causes the thyroid to enlarge and other symptoms are due to the excess of thyroid secretion.

The patients usually affected are females, about the middle period of life, whose menstrual functions are often impaired. Overwork, worry, and severe mental strain, are apparently responsible for the disease in many instances, and a sudden shock or fright accounts for others. The protrusion of the eyeball is a marked feature of the case, and has been supposed to be due to the increase of the fat about the eyeball, but this is very doubtful. When the patient looks down, the upper eyelid does not immediately follow the eyeball, allowing the white sclerotic to be seen between the lid and the cornea (von Graefe's sign). A fine tremor of the limbs is also commonly observed in these cases. The patient is always extremely nervous, and the pulse-rate high; any exertion or excitement increases the irritability of the heart's action, and may also induce considerable respiratory distress. Left to itself, the disease in some cases tends to improve, but in others it may progress to a fatal issue from weakness or heart complications.

Treatment must, in the first place, consist in freeing the patient, if possible, from all sources of worry. Bromides, iron, and perhaps

iodide of potassium are to be administered internally, attention being also directed to correcting menstrual disorders, or any other disturbing causes of any kind occurring within the body; thus, the cure of a nasal catarrh has several times led to a rapid improvement of the symptoms. Phosphate of soda has lately been much commended in this disease, and when conjoined with suitable hygienic measures it is good.

Since the introduction of the theory that the disease is mainly due to the thyroid, surgical treatment by removal of a portion of the gland has been suggested, and the results gained so far have been encouraging, although the operation is not devoid of serious risk, and should not be lightly undertaken.

The Chest.

Empyema, or suppuration within the space in which the lung lies, results not only from injury from force, but also as a sequel of a simple pleurisy, or as a complication of various affections of the lungs. The pus, if left alone, usually comes to the surface between the ribs. The lung on the side affected collapses and may not expand again. Treatment is by operation and should not be delayed.

INSTRUCTION TWENTY-ONE—*Diseases of the Breast*

Cancer and Other Diseases of the Breast

Important Information for Mothers and Daughters.

NOTE: The Arch Enemy of Middle Life and Beyond is Cancer. One Woman in Nine and One Man in Thirteen Dies with Cancer.

Subject Reference.

*For Cancerous
Growths, Tumors
and Cysts see pages
60-72.*

*For Cancer of
Lip see page 156;
Bowel, 195; Rec-
tum, 213; Bladder,
223; Stomach, 404.*

Congenital Malformations of the breast are much more common than is usually thought. One or more accessory (or extra) breasts or nipples are found either below the normal one or just above it, but sometimes they have been found in the armpit, on the outer side of the thigh, or other curious situations. They are usually very rudimentary, but in a few cases they have secreted milk. The existence of these structures probably explains the occasional onset of cancer in unusual sites, as, for instance, when it originates in the armpit. Very rarely the breasts are entirely absent.

Fissures of the Nipple (cracked nipples) seldom occur apart from

nursing. It is due usually to a want of care and cleanliness on the part of the mother, and with a tender condition of the skin, which might have been prevented by bathing the parts during the later weeks of pregnancy with spirit, so as to harden them. The actual fissure is generally brought about by leaving the nipples wet after nursing. Nursing becomes exceedingly painful, and if persisted in, the wound may become infected, the inflammation spreading to the breast.

Treatment.—One of the great essentials in order to prevent the occurrence of cracks is to bathe the nipples with some dilute antiseptic, such as boric lotion, immediately after nursing, and then to dry them thoroughly. If at all tender, a little powdered boric acid and starch should be dusted over them in the intervals. When a fissure has formed, it should be dressed with cooling or antiseptic lotions—e. g., lead lotion, or boric acid lotion. Sometimes more stimulating applications are required, such as a solution of sulphate of copper (blue vitriol), or even of nitrate of silver (lunar caustic). It is also very good to paint them over with equal parts of glycerine and sulphurous acid.

Eczema of the Nipple may be simple, needing nothing but ordinary treatment, or it may take on special characteristics, being known as **Paget's Disease**, and is then supposed to be due to the presence and action of a low form of animals. No local treatment is of any avail, but the case must be carefully watched, and, on the appearance of any suspicious signs, the breast and axillary glands should be removed by operation.

Inflammatory Affections of the Breast.

Acute Mastitis (Inflammation of the Breast) is naturally most often met with in **puerperal**¹ women, owing to the sudden use of the breast after the birth of a child, and to the activity during lactation (or nursing). It results most commonly from a sore or cracked nipple, through which germs find their way into the breast. Simple obstruction to one or more of the ducts from inflammation of the nipple, without any external wound, also causes inflammation, which is frequently not suppurative in character. In **non-puerperal** women acute mastitis may result from injury. Occasionally inflammation of the breast occurs after the disappearance of the swelling of the parotid gland in mumps; whilst in girls about the age of puberty a

¹Puerperal—having recently given birth.

subacute inflammation, involving both the breast and areola, has been observed. In newly-born infants a similar inflammation, occasionally running on to suppuration (or pus gathering), has been seen, possibly resulting from an infection of the gland ducts during birth. A slight enlargement, with congestion of the breasts, often occurs after birth, and may be due to, or is certainly aggravated by, the foolish habit followed by ignorant midwives of pulling or forcibly squeezing them in order "to break the nipple-strings." (See section on The Baby.)

Signs and Symptoms.—An inflamed breast becomes swollen, acutely painful, and tender. The gland is felt to be enlarged and hard, or firmer, whilst if lactation (or nursing) is progressing, the milk is to some extent diminished; but owing to the inability of the mother to allow the child to suck, on account of the pain, considerable tension results from accumulation of milk. If a gathering follows, the skin over the breast becomes red and puffy.

Inflammation of the breast usually occurs in women who are anemic and debilitated. Even the simple forms cause some fever and malaise (general wretchedness), and this becomes greatly exaggerated if a gathering results, owing partly to the severe pain thus induced, and partly to the absorption of toxines (poisons from the pus).

The **Treatment** of simple acute mastitis consists, in the first place, in supporting the inflamed breast by means of a sling or bandage, and in binding the arm to the side, so as to keep the muscle on which it lies at rest. Hot fomentations are then applied, and any tension due to milk relieved by the breast-pump. The bowels are opened with salts, and the patient placed on a light and nourishing diet, whilst stimulants and tonics, such as iron and quinine, may be given. As soon as the acute stage is passed, friction with warm oil, and perhaps the use of a belladonna ointment, are advisable.

When a gathering is threatening, the breast may be poulticed until pus is present; but under no circumstances must the abscess be allowed to burst into the poultice, and thus become septic. If such a misfortune is permitted, chronic suppuration may ensue, and the breast may even become riddled with sinuses. The most rigid cleanliness must be maintained, and as soon as pus is evidently present it must be let out by lancing. The incisions should radiate from the nipple. One or more may be needed. With such treatment the best of results may be attained, and it is astonishing how quickly the functions of the breast are restored, and how slight is the permanent injury inflicted on the parts. An **abscess** under the breast is best

opened towards the lower and outer side, but also at any spot where pus points.

Chronic Mastitis (Inflammation of the Breast).—This occurs as a result of imperfect return of the gland to rest after the period of nursing. It also may arise from blows or squeezes, and is often met with in young women. There is an enlargement of one or more parts of the organ, which are usually tender, and often excessively painful, the pain being of a neuralgic character, and increased during menstruation. The condition is of comparatively little importance, but may give rise to a great deal of anxiety and worry. All that is necessary in the shape of **Treatment** is to support the part and keep the arm at rest in a sling, whilst an ointment containing belladonna, or a belladonna plaster, may be applied.

Another form occurs most frequently in women with small or undeveloped breasts, who have passed, or are near the climacteric (change of life). It is, however, sometimes met with at an earlier age.

Symptoms.—The condition often passes unnoticed in its early stages, until a distinct tumor or lump has formed, which is lumpy and hard to the touch, and often very painful. The breast may be slightly enlarged, and there is, perhaps, some sinking in of the nipple; but this is by no means always so. A slight wasting discharge is sometimes noticed, but as a rule only in the later stages. The skin rarely becomes adherent to the swelling, but can easily be pinched up over it, whilst the lymphatic glands in the axilla may be slightly enlarged and tender. On careful examination of the breast, the lumps are found limited to one particular part, for although a distinct enlargement of one portion may be present, yet the whole organ feels more or less “lumpy,” and not unfrequently the other breast has the same change. There may be but little pain, but on the other hand this is sometimes one of the most marked features of the case; it is of a neuralgic type, and usually increased at the menstrual periods.

If left to run its course, the disease may remain much in the same condition for many years, and even in time disappear; but more frequently it slowly progresses, and then results in one of three conditions: (a) **General atrophy**, the breast becoming shrunken, hard, and nodular (lumpy). (b) More frequently **general cystic disease** follows, a condition in which the organ becomes transformed into a number of cysts (little sacs). (c) There is some question as to whether or not **cancer** is a sequel of this disease; but there is abundant evidence to prove that any continued irritation in an organ

like the breast renders an individual with a cancerous tendency more liable to its development.

The condition often simulates somewhat closely a hard cancer. The chief points of distinction, however, lie in the facts (i) that the whole breast is more or less involved; (ii) that the opposite organ is very often similarly affected; (iii) that enlargement of the axillary glands is less common than in hard cancer, and even if enlarged they are not hard as in the latter disease; and (iv) that the skin is usually free from the mass. Moreover, the tumor is never adherent to the fascia underneath, nor is it of stony hardness; it is often more scattered and less defined than a cancerous growth. In doubtful cases an exploratory operation can alone decide.

Treatment.—In the early stages friction with some soothing application may be used at the same time that the breast is supported, and freed from the irritation of badly-fitting stays. Firm and equable pressure, as by strapping, is also useful in some cases, whilst iodide of potassium may be given internally (4 grams in water after meals). If a definite tumor is present, and especially if the patient is anxious and worried about herself, it is better to remove the affected parts; a breast which is extensively affected should be removed, especially when there is an hereditary tendency to cancer.

Cysts of the Breast.

I. **Retention Cysts** arise from some obstruction to the ducts by which the milk is unable to escape. They are met with most frequently in women during or after the puerperal period. It usually results from some compression of one or more of the ducts, connected with a sore nipple, and contains dried milk; it forms a rounded swelling, and is located near the nipple. It is treated by a simple operation, laying the part open, removing the contents, and stuffing or draining the cavity.

Tumors of the Breast.

In investigating any case of tumor of the breast, the surgeon must never arrive at a hasty conclusion, but only give an opinion as to its nature after a careful and detailed examination. Thus, the age and previous history of the patient should be considered, as also the family history. There can be little doubt as to the occasional tendency of tumors to run in families. The length of time for which the swelling has been observed should be ascertained, and whether

or not it varies in size at the menstrual periods. The general appearance of the patient should be noted, as also the fact whether or not pain, local or neuralgic, is complained of. It is not unusual for pain to be referred to that part of the shoulder supplied by a branch of the same nerve that goes to the breast.

Fibro-adenoma (or Adeno-fibroma) is the most common mammary tumor met with in young people before the age of thirty. It is often attributed to a blow or squeeze, and doubtless such accidents are responsible for many of them. It occurs as a more or less rounded or oval mass, which, if placed superficially, moves freely on the breast substance, and, indeed, may be described as floating in it. If situated deeply, it still appears freely movable, but is not so evident. It is usually firm, and more or less elastic, of slow growth, whilst it may be either painless, or in anemic and nervous women exceedingly painful, the pain often increasing at the menstrual periods. There is no concurrent enlargement of the axillary glands, unless arising from other causes, and no retraction of the nipple, with which it is entirely unconnected, whilst the skin over it does not dimple. The general health is unimpaired unless the patient is suffering from an associated anemia.

The **Diagnosis** is readily made if the above signs are considered. It differs from chronic interstitial mastitis or a serous cyst by its definiteness and free mobility, whilst from malignant tumors it is distinguished by its slow rate of growth, and its freedom from either the skin or surrounding parts.

The **Treatment** consists in its removal, which is easily effected.

In **cysto-adenoma** of the breast, a blood-stained discharge from the nipple may occur. The tumor produced is irregular in outline; it is usually painless, and unaccompanied by enlargement of the axillary glands; if of large size, blue veins are seen coursing over it. In the later stages it becomes adherent to the skin, and, finally, owing to the pressure of the tumor, the skin may give way, allowing the growth to protrude. Such will be followed by the development of a fungating (cauliflower-like) mass, which bleeds readily, and becomes extremely offensive. With care a probe can be passed between the growth and the thinned and stretched skin, which has merely given way, and is not incorporated with it; this fact is a ready means of distinguishing this condition from a fungating cancer. The tumor is benign in nature; it is never spread widely, and can be readily and completely removed, so that there is but little tendency to recur. In the early stages it is unnecessary to take away the whole breast if

the tumor can be efficiently dealt with otherwise, but in the later stages the whole organ should be excised.

Sarcoma of the Breast is not a common disease. It originates in the connective tissue of the organ, being deeply placed in its substance, or perhaps more frequently developing in the outer and upper part. It forms a soft, somewhat elastic swelling, which grows rapidly. It sometimes gives rise to other growths in the axillary glands, or becomes spread throughout the body by means of the blood-vessels. It usually occurs in women between the ages of thirty and forty, whilst its rapid growth and absence of sinking of the nipple or dimpling of the skin are useful signs in deciding on its nature. Should pregnancy follow, it may increase in size at an alarming rate.

The **Treatment** consists in the removal of the entire organ at as early a date as possible, together with the axillary glands.

Cancer of the Breast.

No organ of the body, with the exception of the uterus, is more frequently the seat of cancer than the female breast; it also occurs in the male subject, but is about a hundred times less common than in the other sex.

Causation.—The breast is an organ subject to great changes in activity, richly supplied with blood, and closely associated by nervous connections with other organs of the body, especially the uterus. At the climacteric (or change of life), its functions are at an end, and it usually undergoes a certain amount of degeneration (that is, the milk-forming cells disappear). In such an organ changes are very likely to ensue which may result in the formation of a cancerous tumor. Such is usually met with after the age of forty, although the disease may prove fatal at a much earlier date. It equally affects women who have borne children and those who have not, and whether or not the woman has nursed her children seems to have but little influence. The left breast is more often affected than the right. It is frequently attributed to some injury, such as a blow or squeeze; whilst there is little doubt that badly-fitting stays are responsible for some of the cases. It not uncommonly follows eczema of the nipple. The question as to heredity is one exceedingly difficult to decide, and, although it may be a marked feature of some cases, it is somewhat doubtful whether, as a general rule, it has any considerable influence.

Two distinct types of cancer are met with in the breast—viz., (1) glandular cancer (including scirrhus and encephaloid); this arises from the milk-forming cells; and (2) duct cancer; this arises from the cells lining the ducts or milk-passages.

1. **Acinous Cancer** is the form almost invariably seen; the division into scirrhus and encephaloid is entirely artificial, depending on the greater or less amount of fibrous tissue present in any particular case, and is not a matter of great importance.

Scirrhus (or Hard Cancer) usually commences as a hard limited mass, situated most commonly in the outer half of the organ. It is closely united to, if not absolutely incorporated with, the breast substance, and on careful examination by the fingers its margin is found to be not so exact as at first appears. In the early stages it is entirely distinct from the skin, which moves freely over its surface; but as growth proceeds, the skin becomes more or less fixed to the growth, and hence, on attempting to move it upon the tumor, an appearance of dimpling results. (The skin has strong fibrous bands

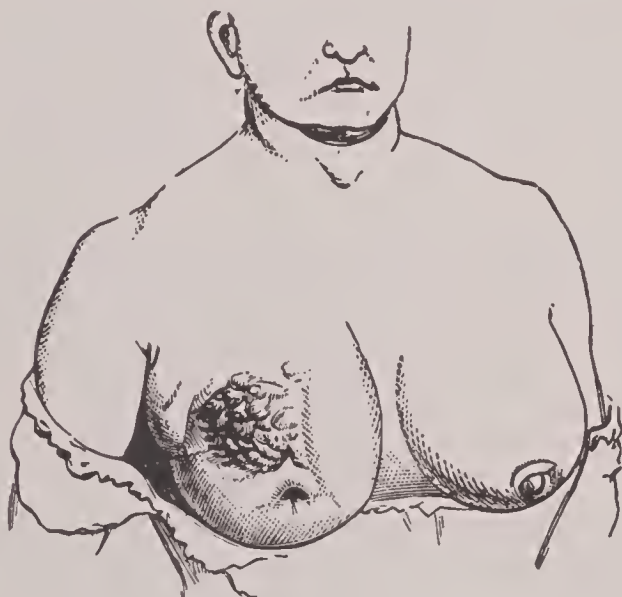


Fig. 293.

A hard cancer of the breast. The skin is involved and the nipple is retracted or drawn in.

passing deep into the healthy breast. In cancer these contract and so pull the skin and the breast substance closely together.) At the same time, the whole breast is acted upon in a similar manner, so that the affected breast often seems to be smaller than the other; and, since the upper half of the gland is usually affected, the nipple may be drawn up so as to be at a higher level than its fellow, as well as being sunken in (from the traction on the ducts). The tumor itself is rarely one of great size, so long as it retains its scirrhus nature. A scirrhus is often extremely painful and tender; but not

uncommonly the pain is intermittent, and of a neuralgic character, extending to the shoulder, and perhaps only felt on touching the breast or handling it. As the growth increases in size, it becomes adherent to the fascia beneath it, and may even extend into the underlying muscular substance, so that, on examination, it is found that, although movable across the fibers of the muscle (up and inward or downward and outward), the breast cannot be moved with them when the arm is held out and back.

The **lymphatic glands** in the axilla soon become enlarged, the disease rarely lasting many months without this complication. After a time even the glands above the collar-bone are affected. When the deeper part of the breast is attacked, the disease may spread to the glands deep in the thorax along the lymphatics, which accompany the blood-vessels; and thus deposits develop within the chest or thorax which even extend deep in and affect the pleural cavity and lungs. In those cases where the growth is situated near the inner edge of the breast, the free lymphatic communication across the middle line allows of the transmission of the disease to the glands in the opposite axilla, and possibly a cancer of the opposite breast may arise from this cause.

The **skin** may be affected in many ways. We have already mentioned the dimpling which is met with over the tumor in the early stages. As the case proceeds, the cancer extends along the bands of fascia outwards, so that the skin itself becomes cancerous, feeling firm and brawny, and looking congested and purplish in color, whilst a branny peeling off is usually present. A crack or fissure at length forms, giving exit to a little watery discharge, which at first scabs over, but finally leaves an ulcerated surface, which slowly extends, and may attain considerable size. A typical **scirrhus ulcer** is hollowed out; its surface, if kept clean, is covered with smooth granulations, discharging a considerable amount of bloody fluid, but if neglected, it becomes sloughy and offensive; it is surrounded by a projecting elevation of the tumor substance, forming a sort of rampart around it.

In the later stages, the patient passes into a state of "cachexia," becoming emaciated and exhausted. Finally, death from exhaustion ends the scene.

Encephaloid Cancer occurs less frequently. It is a somewhat soft, rapidly-growing tumor, which quickly spreads through the whole organ, and gives rise to affections of other parts at a much earlier date than the preceding form. It does not tend to cause retraction

of the nipple or dimpling of the skin, the latter structure becoming distended, with blue veins coursing under it. Later on the breast becomes enlarged and prominent, the skin is joined with the tumor, ulceration follows, and a foul mass soon tends to sprout up through the opening.

Finally, in elderly women, a chronic form of cancer is met with, known as **Atrophic Scirrhus**, in which the disease may last for many years without much definite spreading. Cases have been known to persist for fifteen or twenty years, the patient ultimately dying of some other malady, though, where the individual has lived long enough, scattering has usually been observed. The nipple is deeply retracted, and the tumor and breast substance in the most marked cases are scarcely discernible.

2. **Duct Cancer** is an exceedingly rare form of the disease. It is characterized by the development of one or more nodules of a malignant nature within the dilated ducts, and usually situated not far from the nipple. They have many blood-vessels, and a blood-stained discharge from the nipple is usual. These tumors always grow slowly, and do not attain any great size, but when situated near the skin give rise to a round dusky-red swelling. The nipple is not retracted, and enlargement of the lymphatic glands not constant. The diagnosis can be established with certainty only by microscopic examination after removal.

The **duration** of cancer varies considerably in the different forms. The encephaloid type runs a rapid course, and will probably destroy the patient's life in six to twelve months. Duct cancer is very slightly malignant, whilst atrophic scirrhus is similarly slow in growth, and in both these forms death may be postponed for a considerable period, and is often due to some other disease. A circumscribed scirrhous tumor is stated to end fatally, on an average, in between two and three years if no operative treatment is undertaken, whilst removal of the mass will probably add another year or eighteen months to the patient's life. These figures are, however, derived from statistics of operations performed before the general adoption of the more exact and extensive measures which are now usually undertaken, and it is likely that they considerably underestimate the benefits derived from operation.

Treatment.—This necessarily consists in the removal of the tumor by operation; but in order to give the patient as good a chance as possible of a permanent cure, the operation should be extensive and complete.

Diseases of the Spine

Subject Reference

*For Deformities
of the Spine, see
pages 140-144.*

*For Injuries of
the Spine, see
pages 122-124.*

Spina Bifida, Tubercular Disease, Angular Curvature (Hunch-Back), Spinal Abscess.

Spina Bifida is a condition of imperfect development of some portion of the posterior aspect of the spine, with or without a similar affection of the spinal cord and its coverings.

A spina bifida forms a tumor in the middle line of the back, most commonly involving the lower part of the spine; it may be covered by normal skin, but usually that over the top is thin and translucent, and not uncommonly a certain amount of blood-red tissue is incorporated in it. On squeezing the tumor, its size can be diminished, and in infants distension of the anterior fontanelle (space in the top of the skull) can be felt at the same time, showing that the sac is filled with cerebro-spinal fluid, and there is always a distinct impulse (or shock of the tumor) on coughing or crying. The defect in the posterior portion of the vertebræ is very evident, the edges of the bones being felt at the margins of the tumor. Various other deformities may be associated with spina bifida, especially hydrocephalus and club-foot.

The **Prognosis** of the case depends mainly on the thickness and character of the overlying skin; if it is thin, and the spinal cord evidently adherent to it, as sometimes indicated by a scar-like depression or dimple, the sac is very likely to give way, causing either death from sudden escape of cerebro-spinal fluid, or in a few days from septic meningitis. If the spina bifida is small, and covered with healthy skin and subcutaneous tissue, the patient may reach adult life. Occasionally one, with only a small opening of communication with the spinal canal, may be cured spontaneously by the opening being gradually shut off.

Treatment.—The majority of these cases are best left alone, the tumor being perhaps guarded from injury by the application of a suitable cap. If the sac is gradually increasing in size, and threatening to give way, operation is absolutely necessary if life is to be saved.

Tubercular Disease of the Spine or Spinal Caries (Pott's Disease, Angular Curvature).—The above names are applied to tuberculosis of the backbone. It begins almost invariably in the bodies of the

vertebræ; as a result these structures are more or less destroyed, as also the discs between them leading to the so-called "angular curvature" of the spine. The deformity, though occasionally angular, is by no means always so. This is commonly known as **hump-back** or **hunch-back**.

The **Causes** of tubercular disease of the spine are much the same as those of tuberculosis of any part of the body, viz.: it affects an



Fig. 294.
Angular curvature of the spine
due to Potts' disease (tubercu-
losis of the spine).

individual **predisposed** to tubercular disease either by some **inherited tendency**, or by **impairment** of his general health, as from some preceding illness, or exposure to defective sanitary conditions. The actual deposit of tubercle germs is probably due to some injury which, though slight, and perhaps not noticed at the time, is sufficient to cause some local loss of vitality, thereby forming a favorable spot in which the germ can grow and thrive. It is most frequently met with in children, but may arise at any age, and equally in either sex. Sprains and strains of the spinal column, or of the soft parts attached to it, are the injuries mainly responsible for it. Any part of the spinal column may be involved, but just above the small of the back is by far the commonest. The neck region is rarely attacked, except in children. The disease may attack only one or two bones, or it may spread along and affect many of the vertebræ; or it may begin in several places at once.

There may be no pus, or much pus may be formed, and in some cases there are large pieces of dead bone (sequestra).

Cure is effected by the bodies of the vertebræ falling together and becoming joined, so that a deformed and immobile condition of the affected portion of the spine is often the best result that can be expected. The new bone thus formed is very dense and hard.

The **Signs and Symptoms** produced by tubercular caries of the spine vary considerably in different situations, but for practical pur-

poses may be sufficiently described under the following four headings:

1. **Pain** is a constant and invariable accompaniment of the disease, although in the early stages it may not be specially prominent, being only discovered by careful examination. It is of two main types, the local¹ and the referred.² **Local pain** is more or less similar in character to that always experienced in disease of bones, although, owing to the spongy nature of the bone, there is often but little tension, and hence the pain here may be slight. It can, however, be elicited in all cases, either by pressure or tapping over the spine, or perhaps more effectually by pressing at the side of the spine. Movements of the spine, bending or twisting, are similarly painful, whilst the same result can be brought about by jarring the spine, as by a blow on the head or buttocks. **Referred pain** is produced by pressure upon the roots of the nerves as they come out between the vertebræ; consequently it is always noticed in those parts of the body which are supplied with sensation by the nerves that leave from the spinal canal in the diseased area. If the lumbar region is affected, the pain is referred down the legs; in the region just above the small of the back if diseased the pain may be noticed in the lower part of the abdomen, or over the buttocks; in the lower region of the rib-vertebræ pain is referred to the pit of the stomach, children who are unable to tell clearly its precise nature complaining of "bellyache;" in the upper back and lower neck regions the pain extends into the arms, whilst in the upper neck region the pain may be felt over the collar-bone, around the ear or over the back of the head.

2. **Rigidity** of the spine is a constant accompaniment of Pott's disease. In the **early** stages it results from muscular spasm, the object being to fix and immobilize the painful part. If the lower portion of the spine is involved, the back is held stiff and straight, the patient abstaining from all movements which would bend or stretch it. Thus, in order to pick up an object from the floor, the knees and hips are bent, and the patient gradually lets himself down with an absolutely rigid back into a sitting or squatting posture; the body is raised in a similar manner by resting the hands upon the thighs, the patient, as it were, climbing with extended arms up his own legs. In a child rigidity in the small of the back region can be demonstrated by laying him **on his face**, grasping the ankles, and ascertaining the amount of movement of the spine at that region by lifting the legs from the table, and also by moving them from side

¹ *Local* means at the place diseased.

² *Referred* means felt at some other part than the place of the disease.

to side. In a healthy child the legs can be elevated, and the spine bent back nearly to an angle of sixty degrees; whilst bending sideways to the extent of thirty or forty degrees on either side of the middle line is possible. When caries is present, neither of these movements can be obtained in the small of the back, but the ribbed part and chest move, too. In cervical caries the patient steadies the head, and at the same time raises the shoulders by the help of the muscles, whilst the chin is often supported by one hand, and the patient twists his whole body when he wishes to look sideways.

In the later stages of the disease, when repair is taking place, or has occurred, rigidity of the spine is due to the bones growing together.

3. **Deformity**, the result of Nature's method of repair by means of joining the bones together, is necessarily produced in almost all instances, although in a few cases, taken in hand very early, it is possible that cure may be obtained without it. In the lumbar region, where the affection is often limited to a part of two vertebræ, there is usually little or no displacement. When a large number of

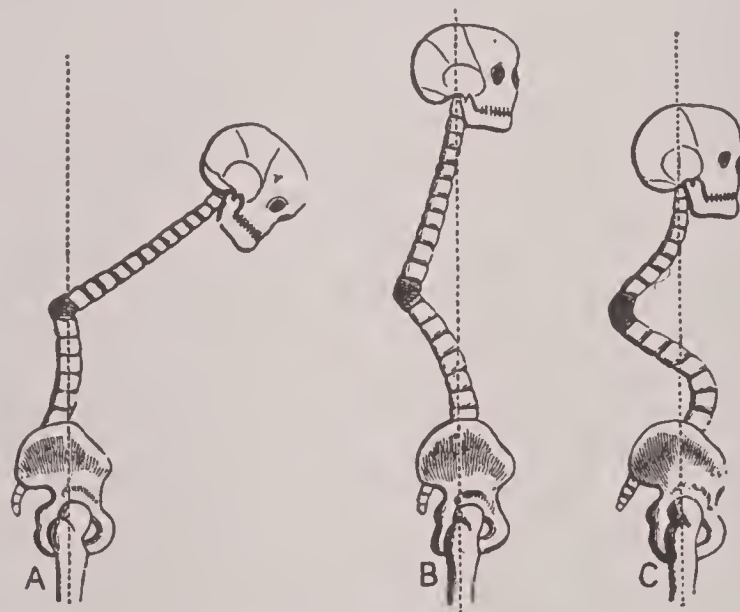


Fig. 295.

Spinal curvature due to tuberculosis. In A is shown the effect of the destruction of the bodies of the vertebræ. In B is shown how the body is erected by increasing the curves of the spine. In C the same is shown more exaggerated.

vertebræ are affected, as is common in the dorsal region, the curvature is never angular, but the whole region becomes bent forwards, and curved, or even almost rectangular. In the back where the spines of the vertebræ are long there is a prominent hump. In the neck region there is rarely much deformity, owing to the small size of the

vertebræ, and to the stunted shape and deep position of the spinous processes; if, however, several bones are involved, the head and the upper part of the spine may be carried forwards.

Changes in the shape of the thorax necessarily occur in the more advanced cases, the breast-bone becoming curved forward and the ribs crowded together to such an extent as to almost obliterate the spaces between them. The lower floating ribs may, however, retain their normal position, and thus a horizontal groove may be produced corresponding to the line of the tenth rib. In such cases the patient becomes much stunted in growth, and dwarfed, constituting the typical "hunchback."

4. **Abscess** is the most serious symptom which arises in the course of spinal disease, for, owing to its deep origin, it often attains considerable size before it is recognized or treated. The pus extends in various directions, according to the portion of the spine involved.

In the neck region the abscess may form a swelling in the back of the throat and interfere with breathing or swallowing. It may burst into the throat or may come to the side of the neck, or into the arm or groin or leg. In the dorsal region the abscess may pass straight back to the skin or up or down or even around to the side. It follows the path of the nerves or is guided by the fibrous layers among the muscles. An abscess from tuberculosis of any part of the spinal column may pass down and appear anywhere about the hip, especially in the groin, or anywhere, even as far down as the heel.

The general disturbance due to these abscesses is usually but slight; perhaps there is a small rise of temperature, but if, as occasionally happens, ordinary pus-forming germs find their way into the sac from within the body, this may become more marked.

Special mention must be made here of a grave complication only occurring in the upper cervical region, and which may result in sudden death. The spine may be so weakened that it becomes very easily dislocated or broken, just by the weight of the head.

Course of the Case and Prognosis.—Left to itself, the disease always gets worse more or less steadily, the bone decay becoming gradually more marked, and abscesses tending to form. If treated properly, and taken in hand early, repair by union of the bones may be confidently expected. Even when an abscess forms, prolonged rest may lead to its disappearance. Should, however, the abscess burst, or be opened, and allowed to become septic, hectic fever is almost certain to develop, and the patient sooner or later is exhausted by the discharge, and dies from exhaustion. Bed-sores, cystitis, men-

ingitis or tuberculosis of other parts, such as the lungs, brain or kidneys, may occur. In spite of these possibilities, however, the prognosis is good as regards life in cases free from complications, and where suitable treatment has been adopted.

The **Diagnosis** of spinal caries is never a matter of difficulty when the characteristic deformity exists, but in the early stages when the displacement is not evident, or there is only the slightest prominence of the spinous processes, it is likely to be mistaken for a simple rickety or habit curve; while if neuralgic pain is a prominent symptom, it may possibly be looked on as a case of spinal or intercostal neuralgia or rheumatism, or even ascribed to kidney disease. Tumors of the spine also produce symptoms somewhat resembling those of spinal caries. Frequently the course of the disease and the result of treatment must be mainly relied on in forming a diagnosis. The spine should always be examined from before and from behind, and pain on pressure over the transverse processes and rigidity of the back are the symptoms which are most important.

Treatment.—The great essential in the treatment of spinal caries is absolute immobilization, that is, prevention of movement of the spine, perhaps also with the application of some mechanical support, which shall take the weight of the body from the seat of injury. This may be effected in any of the following ways:

(a) **By the Adoption of the Recumbent Posture.**—The patient is kept in bed either in the prone or supine position, until the pain in the back has diminished to such an extent as to warrant the application of a spinal support. In any but the youngest children the prone position on a suitably constructed couch may be adopted with advantage, since by this means the weight of the body is more completely taken off the spine, while congestion of the diseased parts is less likely to occur, and, moreover, local applications, such as blisters, can be made. In many cases it may be advisable to combine treatment in this fashion with the application of a removable leather spinal jacket. If thought desirable, extension by weight and pulley attached to the legs, as described under fracture of the hip, may also be undertaken in these patients; pain and irritation due to the pressure of the diseased bones one on the other may be reduced to a minimum in this way.

(b) **By the Application of a Plaster Jacket.**—If the disease exists in the dorsal region, the trunk is encased in plaster of Paris, which should extend from the armpits to just below the top of the hip bones. The jacket must be worn until all pain and evidence of active disease

have disappeared, and after that the patient should be fitted with a support for a time.

(c) **By the Use of Phelps' Box.**—This consists of a wooden box 6 inches deep, the lower end of which is divided into two portions, one for each leg, a suitable opening being left at the junction of the divided parts for the passage of the excreta. Careful padding is applied to the whole of the interior, and the child is strapped and

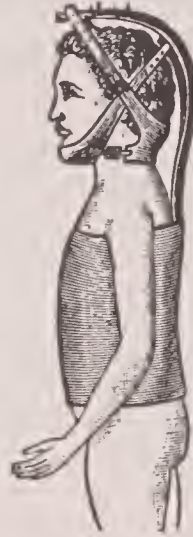


Fig. 296.
Jacket and jury-mast to support the head when the spinal column is tuberculous in the neck region.

bandaged into this apparatus, and kept there for a period varying from six to twelve months. The whole trunk is thus absolutely immobilized, and one great advantage is that the patient can be easily carried about in his box, and taken into the open air. Extension or straightening and stretching of the spine can also be made, if necessary.

(d) In very young children perhaps the simplest apparatus is a double Thomas' splint, with a suitable crutch above to fix and support the head.

During the whole course of treatment, the general condition of the individual must be carefully attended to, and suitable food and tonics administered. Wherever possible, the child should be taken regularly into the open air and in the advanced disease a change to the seaside is often most beneficial. When all symptoms of pain and irritation have disappeared, the patient may be allowed gradually to get about again with a mechanical support, and, indeed, this should not be dispensed with for six or eight months after apparently complete recovery.

Other diseases of the spine are syphilis, rheumatism and bone inflammation not due to tubercle germs.

Tumors may occur in connection with the spine, just as elsewhere.

INSTRUCTION TWENTY-THREE—*Abdomen*

Subject Reference
For Surgical Affections of Stomach,
see page 194.
For the Liver or Gall Stones, page 200.
Hernia or Rupture, pages 201-207.
Intestinal Obstructions, p. 208-218.
Diseases of Stomach, pages 399-407.
Cancer of Stomach, page 404.
Dilation of Stomach, page 405.
Diseases of Intestines, pages 409-419.

Peritonitis *Affections of the Stomach* *Cancer of the Bowel,* *Appendicitis,*

And Other Injuries or Diseases of the Abdomen.

Injuries of the Abdominal Walls.

1. **Contusions** of the abdominal walls vary in their results with the cause and character of the injury. If due to a slight blow, the effects are probably not serious, the patient merely suffering from pain and bruising, as in any other part of the body; but if the blow, although slight, falls upon a distended internal organ, such as the stomach or bladder, the organ may be torn, and the contents escape into the abdominal cavity, with fatal results from peritonitis. Any sudden sharp blow, especially on the pit of the stomach, is liable to be followed by severe shock from irritation of the solar plexus of sympathetic nerves, and life itself may be destroyed in this way by syncope (unconsciousness) without the appearance of any evident injury.

In other cases the injury may be limited to the walls of the abdomen, leading to rupture of one or more of the muscles, which run lengthwise near the middle line.

The **Treatment** of an abdominal contusion is always a matter of some anxiety, as it is difficult at first to make certain of the exact nature of the injury, and as to whether or not internal complications are present. In the more simple cases, all that is needed is to put the patient to bed and apply warmth, but stimulants should be avoided, if possible, for fear of hæmorrhage. In the more severe cases the doctor must be called.

Non-Penetrating Wounds of the Abdominal Wall do not demand separate attention, since there is no special significance about them, and if there are no severe bruises are treated like any other wound.

Penetrating Wounds of the Abdominal Wall may occur with or without injury or protrusion of the abdominal organs. In all cases there is a certain amount of hæmorrhage, greater or less according to the size of the vessels divided, and of shock, which latter is very marked when the organs are injured, while mere protrusion without injury may cause but little effect. Thus, cases are on record in

which a patient has walked to the surgeon for treatment, carrying some coils of intestine in his hands. In all cases the great danger is that peritonitis will be set up either by rupture of the intestine or by infection from without.

The **Treatment** of these abdominal wounds has been entirely altered in recent years, as a result of increased confidence in antiseptic methods. The patient should be kept quiet and the wound covered with a clean piece of cotton or linen till the doctor comes. If no doctor can be got the wound should be carefully washed with clean warm water that has been boiled. Boric acid, 1 in 50, or carbolic acid, 1 in 200, or corrosive sublimate, 1 in 4000, if at hand, may be used to cleanse the wound and any organ that protrudes from it. The intestine or other part should then be put back and the wound carefully and cleanly dressed.

Affections of the Peritoneum.

Inflammation of the peritoneum, or **Peritonitis**, may arise from a variety of conditions, and may present many different forms. It may be limited to some particular locality, or may involve the whole lining of the abdomen and coverings of the organs. Peritonitis is almost invariably due to micro-organisms, the symptoms being largely those of poisoning; death, when it occurs, results from poisons in the blood rather than from the inflammation.

The following forms occur: 1. Peritonitis due to infection from the intestine. Entrance of the germs to the peritoneal cavity may be gained either through some actual opening, such as a penetrating wound or perforating ulcer, or they may pass through an intestinal wall, the resisting powers of which have been diminished by inflammation or injury. The peritonitis due to appendicitis, or to strangulated hernia, is of this type.

2. Peritonitis due to infection from outside. Such occurs in penetrating or operation wounds where the bowel is uninjured, as also in puerperal peritonitis.

3. Peritonitis in the female may be due to the gonococcus, which has traveled up the Fallopian tube from the vagina.

4. Tubercular peritonitis also occurs, and is usually chronic in type.

5. There is a group of cases in which peritonitis is of doubtful origin, possibly arising from chemical or local irritants, rheumatism, etc.; but it is still doubtful whether such can be caused without micro-organisms being present.

The **symptoms** produced are very similar in the different groups indicated above. There are two main kinds—the **acute** and **chronic**. The acute is either diffuse or localized, and the chronic is either simple or tubercular.

Acute Diffuse Peritonitis.—The onset varies somewhat with the cause of the affection; but when due to infection through wound, the symptoms usually commence with pain and distension of the abdomen, together with flatulence and vomiting. The pain may at first be only in some particular spot, or about the navel; it soon, however, spreads, and there are exquisite tenderness and great distension. The patient lies on his back with the knees drawn up, partly to relax the abdominal muscles, partly to prevent the bedclothes touching the body. The abdomen is distended, hard, and extremely tender; it is at first generally drum-like. The pulse is quick, hard, and wiry at first, though later it becomes weak, rapid, and compressible. The respirations are quick, shallow, and the belly wall is not moved in breathing. The temperature, raised at first, tends to become sub-normal from toxemia before the end is reached. Vomiting is usually a prominent symptom, associated perhaps with hiccough; in the early stages the contents of the stomach alone are expelled, but later on they may be mixed with bile, or even fecal material. Though very constant and troublesome, it is much less distressing than that which arises from intestinal obstruction, and, owing to the pain induced by any sudden contraction of the abdominal muscles, the patient ejects the vomit with but little force. Constipation is always present in peritonitis, and no gas passes from the bowel, owing to the stoppage of peristalsis, owing to the inflammation. As the case progresses, the patient rapidly weakens, his face becomes pinched and drawn, the arms and legs are cold, the temperature is usually below normal, and death results from collapse and poisoning.

When due to sudden perforation of the bowel, the onset of the symptoms is associated with profound shock, and the course is very rapid if the opening is large, and the intestinal contents escape early into the peritoneal cavity. Vomiting, too, is usually more marked than when due to other causes. If, however, the perforation is small, there is much less immediate shock, and the symptoms progress more gradually.

Treatment of Acute Diffuse Peritonitis.—In former days treatment consisted in fomenting the abdomen, and keeping the patient fully under the influence of opium, while abstinence from food was enforced, and possibly calomel given; but in view of the fact that

peritonitis usually results from some very definite local injury, such measures are not considered the best at the present day. In diffuse peritonitis treatment of this character is almost certain to be followed by a fatal issue; and although treatment by operation has no great results to boast of, it is the only rational and scientific plan to adopt.

Acute Localized Peritonitis usually arises in connection with some injury or disease of the abdominal contents, which is of such a nature as to permit of the general peritoneal cavity being shut off by adhesions between adjacent coils of intestine, the inflammation being thereby limited. The abscesses arising in connection with appendicitis or pelvic peritonitis are not uncommonly of this nature. They may burst through the barrier of adhesions, and thus set up a diffuse inflammation of the peritoneal sac, or they may burrow to the surface and burst externally, or open into one of the hollow organs.

The **Symptoms** complained of are deep pain and tenderness at the affected spot, together with fever, vomiting, and constipation. At first no swelling or tumor is to be made out, but a feeling of resistance may be noticed in the abdominal walls, which are held tense and rigid, as if guarding the affected spot. As the effusion increases in amount, a tumor becomes evident; it is mainly due to a matting together of the intestines, but with a variable amount of fluid in the peritoneal cavity. If the abscess travels towards the surface, the abdominal wall becomes red and swollen, the tissues being brawny to the touch. Finally the abscess either discharges itself or is opened. If the cavity is treated antiseptically, it rapidly contracts and a cure is accomplished, although adhesions may persist and lead to trouble later on from hampering the intestinal movements.

Treatment of Acute Localized Peritonitis.—In these cases cure can be obtained in favorable cases by keeping the patient quiet and on a low diet, with perhaps a little morphia, and applying hot fomentations locally, while the large bowel is emptied by an enema. Such a course must, however, not be persisted in for too long. An early operation is advisable under such circumstances. The line of treatment marked out for appendicitis should always be followed.

Tubercular Peritonitis.—In this disease the peritoneum becomes infected with tubercle bacilli. If the disease tends to recovery, numerous fibrous adhesions are found, matting the intestines together (fibrous variety). The **symptoms** are very variable. Any and every form of digestive disturbance may occur, including alternating attacks of constipation and diarrhea, with some amount of colic and

vomiting. The onset is generally gradual, but intermissions and relapses are of frequent occurrence. Wasting is, however, always a marked feature. The abdomen is usually enlarged, perhaps tender to the touch, and may contain free fluid or not. This affection is usually seen in young patients, and may be associated with tubercular disease elsewhere.

Treatment in the earlier stages is often successfully undertaken by the physician; but if the condition is progressing, the surgeon may be called upon to deal with it by operation.

Affections of the Stomach.

Rupture of the Stomach results from blows or falls upon the epigastrium, especially after a heavy meal, and then usually involves the lower end. It may also follow a penetrating injury, such as a stab or a fall upon a spike or railings.

The **Symptoms** are those of severe and prolonged shock, with pain and vomiting, the ejected material often containing blood; acute septic peritonitis usually ensues in a very short time, destroying the patient's life in a few days.

Treatment—The patient must be kept at rest and quiet till a doctor comes. Operation is necessary.

Foreign Bodies in the stomach are either those which have been swallowed accidentally or intentionally, or collections, e. g., hairs, wool, etc., due to the constant taking in of small portions which remain in the stomach, and may after a time form large masses. The only treatment possible where the foreign body is of any size is to open the organ and remove it; where, however, it is of small dimensions, e. g., coins, it may be safely allowed to pass onward.

Gunshot Wounds of the stomach or intestine vary considerably in severity, according to the rate and size of the bullet, and the course taken by it. The aperture of entry may be very small. The bullet usually travels in a straight line from the aperture of entry towards the point where it escapes from the abdomen, or where it becomes lodged in one of the more solid organs or in the body-wall. The coils of gut lying immediately beneath the entrance aperture are most severely damaged, but other adjacent coils may also be involved; hence it is not unusual to find a number of wounds in the gut close together.

The **Symptoms** caused by a gunshot injury differ in no particular from those resulting from any other penetrating wound of the bowel. **Treatment** involves an operation as soon as possible.

INTESTINE.

Narrowing (Stenosis) of the Intestine.

This arises from two main causes, viz., scars and cancer.

Scar Stricture usually results from the healing of ulcers which have extended more or less circularly around the bowel. In the small intestine tubercular ulceration is one of the commonest causes, since it always tends to travel around the circumference of the gut.

Owing to the contents of the small intestine being of a somewhat liquid nature, a stricture in this situation often exists for some time before symptoms of any urgency arise. The patient may complain of a certain amount of indigestion and discomfort, but sooner or later the narrowed aperture of the gut becomes blocked either by a fold of the lining or by a portion of undigested food, and thus an attack of obstruction is induced. In the early stages of the disease this can be overcome and remedied by purgatives, but each recurrence is likely to increase in severity, until finally an acute attack supervenes, which kills the patient, unless relieved by prompt operation.

In the large intestine very similar symptoms appear, but the attacks of obstruction are of a somewhat different character, since there is less pain and vomiting; and aperients, instead of relieving the patient, as they often will in the earlier attacks in the small gut, always aggravate the symptoms; there is also a great deal more distension of the abdomen.

The **Treatment** in the earlier stages consists of suitable dieting, and the administration of purgatives, or of large injections, and for a time such will be successful. Sooner or later, however, a more than usually serious attack of obstruction will call for an operation.

Cancer of the Bowel merely gives rise at first to dyspeptic symptoms of varying character, according to the size and situation of the mass, and then to these may be added intermittent attacks of chronic or subacute obstruction.

Treatment.—Whenever a diagnosis of cancer of the bowel has been made or is suspected, an exploratory operation is justifiable in order to confirm or disprove the fact. Unfortunately, physicians are only too liable to leave the case until the progress of the disease has settled the question, and then palliative treatment may alone be possible. If found early enough, the growth, together with a good margin of healthy tissue on either side, should be removed. It may

be necessary to make an artificial opening for the bowel when it is shut off below.

Appendicitis.

This is inflammation of the appendix. It is thought to be more common than formerly, partly because foods have been so much refined. The seeming greater frequency is in part due to better diagnosis and fuller knowledge. The importance of appendicitis lies in the fact that the peritoneum is invariably involved in the inflammation. The symptoms and prognosis vary according to the character and extent of this inflammation.

Cause.—Many different conditions contribute either directly or indirectly in bringing on an attack of appendicitis. (1) The appendix is to be looked on, not as an actively useful structure, but as a degenerated relic or remnant, which is apparently of little value or importance. Hence, as in other similar structures, it has but a poor blood supply, which is better in the female than in the male sex. This may explain why the disease is less common in females than in males. (2) A large amount of lymphoid tissue is present in its walls, so much, in fact, that the title of **abdominal tonsil** has been given to it. Inflammatory processes are readily set up within its walls as a result of the absorption of toxins or organisms from the bowel, which are almost constantly present within it. (3) Its length and direction vary considerably in different individuals. In length it may measure anything between $1\frac{1}{2}$ to 6 or even 8 inches, while, as to direction, it may lie in any; perhaps most frequently it is to be found behind the cæcum (blind pouch), the beginning of the large intestine, and pointing down towards the pelvis. The readiness with which the intestinal contents find their way into it thus varies in different individuals, and it seems probable that appendicitis is more commonly met with where it is so placed as to readily admit material which is with difficulty expelled. A long appendix is also more liable to become twisted on itself. (4) The opening into it is usually a small one, and is guarded by a fold of mucous membrane. Sometimes this aperture becomes blocked, or the orifice narrowed, so that an accumulation of mucus (or slime) occurs within the appendix. (5) Fecal concretions or foreign bodies, such as fruit stones, pips, pins, etc., are also met with within it, and by their presence and irritation may cause an attack of inflammation. Foreign bodies are much less common than was formerly imagined, occurring most frequently in children and young people. The fecal concretions (or single hard

dry masses of feces) are usually the result of chronic constipation, which is to be looked on as one of the active causes of appendicitis.

Apart from these there are other causes of appendicitis, such as rheumatism, and in chronic cases tubercle. Typhoid ulcerations may occasionally be met with in the appendix, as well as in the neighboring intestine. Dysentery is sometimes associated with appendicitis.

Finally, injury in the shape of a strain or sudden twist is not infrequently the cause of an outbreak, and probably acts by displacing a long appendix in such a way as to lead to its kinking and possibly to obstruction of the artery to it.

When once an attack has occurred, some narrowing of the tube is frequently left behind, thus predisposing to a recurrence.

Symptoms.—(1) The mild variety of the disease, known as a simple **catarrhal appendicitis**, with merely a little peritonitis, usually commences somewhat suddenly, the patient being seized with pain in the right iliac region (near the right groin, or about two inches from the point of the hip-bone towards the middle of the body). There are nausea, vomiting, more or less complete constipation, and slight fever (101° or 102° F.). An examination of the abdomen reveals definite tenderness in the right iliac region, most marked at a spot corresponding to the base of the appendix, while the right leg is usually drawn up in order to relax the abdominal muscles. A swelling, generally dull on percussion, may sometimes be detected by palpation, and consists of coils of intestine matted together over and around the inflamed appendix. Such symptoms usually last three or four days, and then, if properly treated, clear up satisfactorily without any abscess formation.

This simple form of the disease is exceedingly common. One-third of all people probably have it at some time. The prognosis is, on the whole, favorable.

(2) The more serious variety, commonly resulting in an abscess, commences in a similar way, but the symptoms are a good deal more acute. There may be an initial rigor, and the temperature soon runs up, even to 104° F. Some general abdominal tenderness and distension follow, and there is no abatement, but rather an increase, in the symptoms at the end of the first three days. Constipation is often absolute, and fecal vomiting may occur. The muscles on the right side of the abdomen are held tense and rigid, and a well-marked swelling can usually be detected in the lower right side. Under a careful treatment this may disappear, and the symptoms gradually abate in their severity, the temperature and the pulse falling at the

same time; but it is very common for suppuration to ensue. This is indicated by the temperature keeping up, or by the pulse rate increasing in rapidity, while the temperature falls. The abscess, if left, may burst into the general cavity of the body. Not infrequently it bursts into the bowel, and thereby relief is gained without the assistance of surgery; some authorities, indeed, maintain that this occurs in every case of the more severe type which gets better. In other instances it may point externally, either through the anterior abdominal wall, which becomes congested and puffy as the pus approaches the surface, or through the loin. In the latter case, it is sometimes found that the abscess burrows widely up and down the back of the abdomen, and may even extend behind and above the liver. In other patients the pus travels downwards and forms a collection behind the rectum; the surgeon must never omit a rectal examination in appendicitis, where the temperature is of such a nature as to suggest the existence of an abscess, and yet no evidence of one can be found. Should it burst into the peritoneal cavity, all the signs of perforative peritonitis come on, including a sudden fall of temperature, and followed by increased abdominal pain and distension. In other cases the patient's general symptoms improve after the first outbreak; but the appendix trouble persists, and gradually a swelling forms, which, on being opened, proves to be a chronic abscess. A fecal fistula may result from the bursting or opening of any of these abscesses.

(3) **Diffuse septic peritonitis** results either from (1) the rupture of an abscess, which has been walled off in the abdomen; this is preceded by the symptoms outlined above, or (2) it may be present from the outset, being due to primary perforation or rupture of the appendix itself. The ordinary signs of acute peritonitis are developed, but possibly there may be some history of pain starting in the right iliac region, which will give a clue to the diagnosis.

(4) **Relapsing appendicitis** is characterized by recurrent attacks of varying gravity in an individual who has been once the subject of the disease. They may occur only at prolonged intervals, or be so frequent as to entirely disable the patient, and are mainly due to the presence of some abnormal adhesion or constriction of the appendix. Where narrowing exists, secretions containing bacteria may be pent up behind the constriction, and from time to time the patient suffers from severe pain of a colicky nature without fever, supposed to be due to an attempt to get rid of the accumulation. Such attacks have been named **appendicular colic**. In a few cases the appendix becomes totally obliterated after a time, a natural cure being thus estab-

lished; but more frequently, if these recurrences are allowed to continue, the patient finally succumbs from diffuse peritonitis or possibly blood poisoning.

Treatment.—Formerly appendicitis was treated only by medical measures; now it nearly always is treated by operation. At any moment complications may develop even in what appear to be simple cases, in which surgical assistance will alone hold out any hopes of saving the patient. In America surgery is the recognized treatment for almost every case of the disease.

In the milder form of appendicitis, where the temperature does not run above 101° and the symptoms are not severe, all that is required in the majority of instances is to put the patient to bed, and apply hot fomentations locally; the lower bowel should be emptied by an enema, and if it seems likely that there is an accumulation of irritating feces within the intestine, a dose of castor-oil or of calomel may be given. A fluid, unstimulating diet is all that is permitted, and should there be much vomiting, rectal feeding may be resorted to. Possibly a little morphia may be given with advantage to quiet the patient and keep the bowel at rest; but the less the better, since it tends to mask symptoms.

In the graver cases the same general treatment may be instituted to start with, but the question as to the advisability of operation will soon have to be faced. There are certain conditions in which all surgeons are agreed as to **operation** being **essential**, viz., where general peritonitis is present, or when an abscess is pointing. In the great majority of cases death will ensue in spite of all our precautions, but the more recent reports certainly hold out a better prospect of success.

When an abscess is evidently present there should be no hesitation in having an operation.

It is, however, in those cases where neither of the above conditions are manifest, and yet the symptoms, both local and general, point to the fact that a lesion of considerable gravity is present, that the greatest difference of opinion exists. We are forced to admit that in many instances conservative or medical treatment will suffice to bring about a satisfactory result; but this can never be depended on, and, unfortunately, only too many patients' lives have been sacrificed through an unwillingness to have an operation, except at the last moment. Early operation is generally the safest plan.

Subject Reference

For Functions of the Liver, see Vol. 1, page 48; also page 117.

For Biliousness, Gallstones, Torpid or Sluggish Liver, see Vol. 1, pages 340-341.

Gallstones

Gallstones: — The Number Varies from One to Many, Occur Most Commonly with Women Who Have Suffered Long from Dyspepsia and Constipation and May Be Associated with Cancer.

The **origin** of gallstones is not yet fully understood, but there seems no doubt that they are due to an inflamed condition of the walls of the gall-bladder or bile passages; they occur most commonly in women who have suffered long from dyspepsia and constipation, and may be associated with cancer.

The **Symptoms** produced are extremely variable. Their occurrence is usually preceded by dyspepsia, which has perhaps lasted for years, and by constipation. Some pain is complained of under the right lower ribs, but possibly nothing very serious is noted, until a medical examination reveals the distended gall-bladder, which forms a tumor projecting from under cover of the ribs, usually the eighth or ninth, and tending to enlarge downwards towards the navel. Such a condition generally yields to medical treatment; the diet has to be carefully regulated, and a sufficient amount of exercise ordered. Alkaline purgative medicines (such as Glauber salts, Rochelle salts, Epsom salts, Seidlitz powders) are to be employed. Massage may be employed to assist in expelling the stones, and drinking considerable quantities of olive oil is also beneficial in effecting the same object.

There are several complications, however, which may call for surgical treatment.

I. Inflammation of the gall-bladder may assume considerable proportions. Acute inflammation is usually due to infection with bacteria, which travel up the bile passages from the intestine. It causes acute pain and tenderness in the right side, together with vomiting, constipation, and fever. The constipation may be of a marked character. Suppuration may follow, the abscess either bursting externally or into the peritoneal cavity, or possibly into one of the hollow organs. In other cases the inflammation subsides after a time, but results in adhesions which interfere with operation, and may also bring on an attack of intestinal obstruction.

2. **Biliary colic** or **gallstone colic** is another most distressing complication, due to the onward passage of gallstones along the bile passages. The pain is of a most acute character, doubling the patient up, and causing considerable shock; it radiates from the right side, shooting over the shoulder and into the back; it commences abruptly and continues in paroxysms until the stone is either discharged into the intestine or slips back into the gall-bladder, leading to a sudden ending of the pain; a sense of tenderness and discomfort may, however persist for some time, and possibly a little jaundice. These attacks sometimes come on at more or less regular intervals, and may be so frequent as to produce great exhaustion. At the time, they should be treated by the application of hot fomentations to the side, and the administration of opium; a large dose of olive oil by the mouth may assist in the passage of the stone. If they recur at all frequently, operation must be undertaken.

3. A gallstone does not always escape into the bowel; it may become impacted (or lodged) and then gives rise to a train of tolerably characteristic symptoms, which vary somewhat with the site of obstruction. Thus there may or may not be jaundice, with or without a tumor in the region of the liver.

Operative Treatment of Gallstones.—The conditions which may call for operation in the course of a case of gallstones are as follows: (a) For recurrent attacks of biliary colic, which cannot be prevented by medical treatment; (b) for persistent jaundice; (c) when the gall-bladder can be felt enlarged and tender; and (d) for acute inflammation of the gall-bladder.

INSTRUCTION TWENTY-FIVE—*Hernia*

Hernia or Rupture

The Protrusion of an Internal Organ or Part, Through an Unnatural Opening.

Subject Reference

For Hernia or Rupture of Infants, see Vol. 1, page 604.

By **Hernia** is meant "the protrusion of some organ from its normal situation through an abnormal opening in the walls of the cavity within which it is contained." In other words, in hernia some internal organ or part protrudes through an unnatural opening in the wall of the cavity in which the organ or part belongs. This may affect not only the abdominal organs, but also such structures as the brain and lungs.

The most common **Situations** at which hernia occurs are those

spots where the body walls are weakened by the passage through them of some anatomical structure, such as the spermatic cord and round ligament (inguinal hernia); or into the thigh from the body (femoral hernia); or at the umbilicus or navel (umbilical hernia). Viscera may, however, protrude through the diaphragm, and in various other situations.

There are many **Causes**. Some are congenital. The testicle originates in the abdomen and passes out through the muscles and down into the scrotum. Its passageway may not close up and thus a canal is left by which a loop of intestine passes out and forms a hernia. The hernia may not show until the age of 14 or thereabouts. Anything that causes straining in emptying either the bladder or the bowel is apt to produce hernia. It also runs in families (or is inherited).

Acquired Causes.—Hernia may result from any condition which tends either to weaken the abdominal walls, or to increase the pressure within the abdomen. Thus, all violent exercise, especially when of an intermittent nature and accompanied by excessive straining, as in lifting heavy weights, may cause its occurrence, and the more so if the individual is forced to stand upright, or wears tight bands or belts around the abdomen. Pregnancy stretches the abdominal walls, and childbirth, by inducing violent muscular contraction, may originate a rupture. Prolonged and severe bronchitis also favors the occurrence of a hernia by the increase of pressure due to coughing; while the straining to pass water in cases of enlarged prostate or stricture may act in a similar manner. Chronic constipation is a frequent factor in its production, especially if the patient makes use of a closet with a high seat; in uncivilized races, where defecation is performed in the squatting posture, the lower part of the abdomen is supported by the flexed thighs, and hernia is very uncommon. Patients with weak and bulging inguinal regions may with advantage use a low commode.

A hernia consists of a sac and its contents, the sac being formed of peritoneum, perhaps thickened by additional coverings, derived from the abdominal walls, and the contents being the protruded organs or parts of organs.

Although at first easily replaced, the hernia soon becomes **irreducible** from adhesions to surrounding parts, though it can still be readily emptied of its contents. **Inflammation** may occur as a result of injury or pressure, causing a localized peritonitis. Natural cure

of a hernia may in this way be occasionally produced by adhesions forming across the neck of the sac and shutting off the communication with the peritoneal cavity.

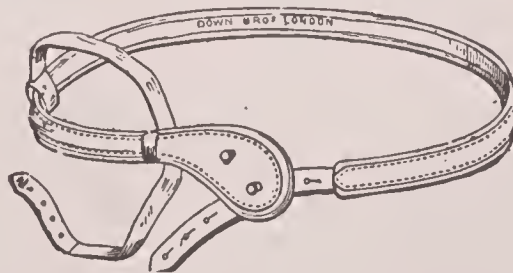
Contents.—Any organ in the abdomen may be found in the sac of a hernia, except, perhaps, the pancreas; as a rule, however, one finds only small intestine or omentum.

Signs and Symptoms.—The characteristic features of a rupture consist in the presence of a rounded or pear-shaped swelling, in one of the situations already mentioned, which increases in size when the patient stands, coughs, or strains, having, as it is termed, “an impulse on coughing” (that is, if the hand or fingers be placed on it the impulse of the cough is felt). If the intestine is present it may be possible to obtain a hollow sound on tapping with one finger on another, while the tumor feels tense and rounded, and on pressure slips back into the abdomen with a distinct gurgle. Various dyspeptic symptoms, and perhaps colicky pains, may be noticed. An omental hernia (one containing only omentum or caul) feels soft and doughy, has a less distinct impulse, or even none, on coughing, and is replaced without a gurgle; it is dull on percussion.

Treatment of Hernia.

Inguinal Hernia.—The term **inguinal hernia** is limited to those conditions in which a protrusion occurs into the canal which leads from the abdomen to the scrotum. If it extends into the scrotum, it is termed **complete**, or **scrotal**; while if it does not pass beyond the muscular wall of the abdomen it is known as a **bubonocoele** or **incomplete hernia**.

Fig. 297.
A truss for the treatment of
hernia (or rupture).



Congenital Inguinal Hernia does not necessarily appear in infancy, its occurrence being often delayed until puberty, or when the patient has to undertake heavy work. This form of hernia is much more frequently met with on the right side of the body, owing to the fact that the right testicle descends into the scrotum at a later

date than the left. It is always characterized by becoming complete at once, and even acute strangulation may immediately follow.

The **Treatment** of inguinal hernia is either palliative by means of trusses, or radical, by means of operation.

Palliative Treatment.—It is impossible to describe a tithe of the varieties which have been suggested. Suffice it to indicate the essentials of a good truss. It should consist of a pad kept in position over the hernial aperture by a steel spring; it must fit the patient accurately, resting behind on the middle of the sacrum, and passing laterally midway between the crest of the high bone and the top of the thigh bone. If the hernia is on one side only, the spring ends on the sound side just behind the point of the hip bone, and is prolonged in front into a leather thong or cross strap, which is secured to a stud on the pad. To prevent it from slipping up, an under-strap passes from the sound side close behind the point of the hip bone along the fold of the buttock (next the upper part of the back of the thigh) to the inner side of the thigh, being fixed finally by a second stud on the pad. This may be rounded or oval in shape, and usually consists of soft iron covered with cork, but polished vulcanite, wood, or an india rubber cushion filled with air, water, or glycerine have

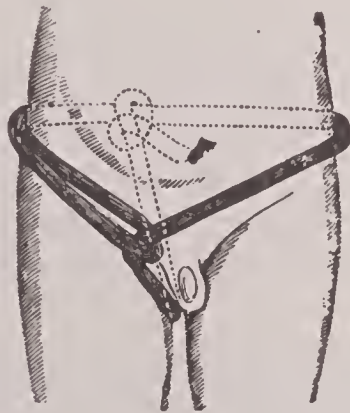


Fig. 298.
Truss made of a skein of wool
yarn for hernia in a child.

been employed instead; it should be well padded with leather, and the strength of the spring must be so adjusted as to retain the hernia under all conditions of strain to which it may be subjected, but without the use of undue force. If such an apparatus is properly adjusted and continuously worn, a cure is sometimes established in the course of a year or two, and in cases of congenital hernia in children a cure may be confidently expected if the mother or attendants of the child conscientiously carry out the necessary details. If the hernia is once allowed to slip down, even after six or twelve months' treatment, all the previous good will have been undone. In addition to

such truss pressure, it is important to remove all causes of internal tension (as by circumcision or by regulating the bowels).

The **Radical Cure** of inguinal hernia is by an operation. It is advisable for strong, healthy people to be operated on, as a hernia or rupture is a very dangerous thing to one who is active. It is not a dangerous operation.

Recurrence after Operation is unfortunately met with only too frequently. It may be due in part to a faulty after-treatment, the patient being given too much liberty at too early a date.

Whenever it appears likely that such an accident may occur, a truss should be ordered. If, however, a hernia has developed, a second operation should be performed, if the condition of the abdominal wall warrants it.

Femoral Hernia.—A femoral hernia is one which, traveling down the canal beside the blood vessels of the thigh, appears at the inner and upper part of the thigh. It occurs most commonly in women, and especially in those who have borne children.

Treatment.—When reducible and of small size, a femoral hernia may be treated by the use of a truss, similar in nature to that used for an inguinal hernia, except that the pad extends somewhat lower, so as to maintain pressure along the course of the canal. A badly fitting truss may compress the femoral vein, and lead to swelling of the leg. Operation may be necessary.

Umbilical Hernia in Infants and Young People (commonly called "starting of the navel") is due to weakness of the navel, which yields. Its occurrence is often caused by continual straining in order to evacuate the bowels or bladder. The condition rarely persists till adult life is reached, and it is readily cured. **Treatment** consists in regulating the bowels, the performance of circumcision, if necessary, while a pad and strapping are applied to the umbilicus. In persistent cases it may be necessary to have an operation.

Umbilical Hernia of Adults is usually due to a protrusion through an opening in the middle line, either immediately above or below the navel, the former being the more common. It occurs most frequently in women who have borne children.

Treatment.—When of large size, and occurring in stout individuals, it should be supported by a bag truss, while the patient is placed on such dietetic and hygienic measures as shall assist in the reduction of excessive corpulency. In favorable cases operative treatment can be undertaken.

Abnormal Conditions of Herniæ.

Irreducibility of a Hernia means that it cannot be replaced. This is generally due to the presence of adhesions, either between the contents and the sac, or between the contents themselves, which are thus united into a mass too large to pass through the opening into the abdomen.

The **local signs** of this condition are very evident, while dyspepsia, a sense of dragging, and colicky pains are among the most prominent symptoms.

Treatment.—1. It may sometimes be remedied by forcible pressure applied at intervals, between which the patient is kept in bed, and an icebag applied so as to contract the parts; moreover, the patient, if fat, should be carefully dieted. 2. In healthy individuals, and if the rupture is not too large, operation is preferable, and much more satisfactory. 3. In a few very aggravated cases, it is only possible to support the hernia by an elastic bag.

Inflamed Hernia is one with localized peritonitis. It usually arises from injury, such as injudicious truss pressure. The symptoms are those of a local inflammation, the part becoming hot, painful, tender, and swollen, and perhaps the skin over it is red; this is associated with general fever, malaise, nausea, and vomiting, while constipation is also usually present. A condition is thus induced somewhat resembling strangulation; but it is distinguished from the latter by the presence of fever instead of shock, the absence of tension in the sac, and the character of the vomiting, which is not fecal.

The **Treatment** consists in putting the patient to bed and restricting his diet to fluids, while hot fomentations are applied to the part. A little opium may also be administered to allay the pain, and the lower bowel emptied by an enema.

Obstructed Hernia is a condition in which the onward passage of feces through the gut contained in a hernial sac is prevented. It is irreducible. It is due to an accumulation of undigested food or feces, the condition being aggravated by the presence of flatus (or gas) derived from the decomposition of the contents of the bowel. Nausea and vomiting are induced, the latter, however, rarely fecal, while constipation is usually present, although the lower bowel may empty itself and flatus may pass. Locally the tumor becomes distended, but not tense as in strangulation, and a doughy mass, which can be moulded and indented by the fingers, is felt within the sac.

There is no tenderness, but the patient usually complains of a good deal of intermittent colicky pain. If unrelieved inflammation may supervene, and may pass on to strangulation, and even death.

Treatment consists in the use of copious enemata, and the application locally of an icebag, followed by carefully applied pressure, so as to assist the onward passage of the impacted contents. As soon as the obstruction is overcome, a brisk purge should be administered.

Strangulated Hernia.

A hernia is strangulated when the contents (bowel, etc.) are constricted in such a way as to obstruct and ultimately stop the flow of blood in the blood vessels contained therein.

A case of strangulation of hernia is, as a rule, so characteristic that there can be but little uncertainty as to the diagnosis. The **general** symptoms are similar to those occurring in all cases of acute intestinal obstruction. The patient during some sudden effort notices a severe pain; he feels faint, the pulse becomes slow and weak, the temperature falls, and the surface is covered by a cold, clammy sweat. This shock is usually not very prolonged, and is quickly associated with or followed by vomiting, at first gastric, then bilious, and finally fecal. As this continues, the pain increases in severity, and radiates over the whole of the abdomen, which becomes tense, tender and drum-like. Symptoms of exhaustion come on, caused partly by the pain and vomiting, and partly by the inability to take food. Complete constipation is usually present, but the patient may pass flatus or feces from the lower part of the intestine. The swelling is irreducible, tense, extremely tender and painful, and without impulse on coughing. It is hard and rounded if bowel is involved, softer and more doughy to the touch if caul is the content. A doctor must be called at once.

In some of the slighter conditions of strangulation, and especially if the patient has had similar attacks before which have been relieved without operation, replacement may be induced by applying hot fomentations for half an hour, followed by the use of an icebag, reduction then sometimes taking place spontaneously.

The **Operative Treatment** of strangulated hernia should always be undertaken at as early a date as possible, when once it is certain that the bowel is constricted, and cure by pressure has failed. Nothing can be gained by waiting, while even the delay of an hour may make it doubtful whether the result will be successful or not.

INSTRUCTION TWENTY-SIX—Intestinal

Subject Reference

For Cancer of the Bowel, see page 195.

Diseases of the Intestines, pages 409-419.

Obstructions of the Intestines

Constriction, Twisting, Lodging of Foreign Bodies, Strangulation or Kinking of the Gut, Telescoping, Abscess, Fistula and Cancer of the Rectum, Hemorrhoids or Piles, Falling of Rectum, Etc.

Intestinal Obstruction is a condition in which the onward passage of the feces is prevented. In acute cases there is usually also strangulation, that is, the circulation through the vessels is hindered and finally stopped.

Acute Intestinal Obstruction.

The following are the chief **Causes** which give rise to this condition:

1. Constriction by bands or adhesions, resulting from former inflammation; usually occurs under 40 years of age.
2. Volvulus (Twisting). Occurs usually in people over 40 and is generally preceded by constipation.
3. The lodging of foreign bodies, such as gall stones.
4. Strangulation over a band or acute kinking of the gut, both very rare conditions.
5. Acute intussusception (or telescoping).
6. It may be the termination of a chronic obstruction.

The **General Symptoms** of acute obstruction are practically identical with those of a strangulated hernia. The patient is suddenly seized with acute abdominal pain about the navel somewhat of the nature of colic, coming on perhaps during some special effort, e. g., lifting a heavy weight. At the same time he suffers from symptoms of shock, evidenced by a weak pulse, pale face, and cold, clammy sweat, the temperature of the body falling below the normal. The shock is usually recovered from pretty rapidly, but the pain persists, but is liable to increases and intermissions, and soon becomes continuous. Vomiting ensues, being at first limited to the contents of the stomach, but quickly changes to a bilious, even fecal character. Signs of constitutional depression and exhaustion follow in a short time, the pulse being weak, rapid and thready, the temperature remaining subnormal (except occasionally after the beginning of peri-

tonitis, when it may rise a few degrees), the face looking pulled and drawn (*facies Hippocratica*), the abdomen distended and painful. Finally the patient, if unrelieved by treatment, dies, usually within seven to ten days from the onset, owing to exhaustion or perforative peritonitis. Constipation may be absolute from the first, but at any time the lower bowel may empty itself, and raise false hopes as to the outcome.

The only **Treatment** is in operation as soon as possible. The danger gets greater and greater with delay and any attempts to move the bowels with medicine is apt to make matters worse. While waiting for the operation a rectal injection may be given to clear out the lower bowel, ice given to suck and a little opium for the pain under the doctor's orders.

Chronic Intestinal Obstruction.

The **Causes** of chronic obstruction may be divided into:

1. Conditions inside the bowel, e. g., impaction or lodging of feces, foreign bodies, etc.
2. Affections of the intestinal walls, such as stricture, new growths, adhesions or matting together of coils of intestine, contraction or kinking of the gut from disease in the lymphatic glands, etc.
3. Compression of the bowel by tumors, old inflammation, bands, etc., developing outside the intestine.

The **General Symptoms** of chronic obstruction are about as follows: The patient suffers from gradually increasing constipation, alternating occasionally with watery diarrhea, and set up by a catarrh of the bowel, due to the irritation of retained feces. At irregular intervals more severe symptoms arise, viz., pain, colic, vomiting and absolute constipation, owing to some temporary complete obstruction, as by a mass of undigested food or feces. These attacks usually pass off after a time, a copious evacuation of the bowels taking place either naturally or as the result of the administration of a purgative. One of these seizures persists and finally destroys the patient, either by exhaustion, or perforation of the bowel, followed by peritonitis, unless suitable treatment is promptly adopted. The vomiting is never such a marked feature as in acute obstruction, only occurring in the early stages during the subacute attacks; but in the final acute stage it becomes fecal. The abdomen is always more or less distended and tympanic, and its shape varies with the site of the obstruction; if this is situated in the small bowel, the swelling is mainly

central, while if in the rectum or lower portion of the colon, it is most marked in the flanks.

The **Treatment** of chronic obstruction is always a matter of difficulty and anxiety, owing to the uncertainty often felt as to the diagnosis. It ought to be possible, however, to ascertain whether the block is located in the large or small intestine, since the character of the abdominal distension and the symptoms are tolerably different in the two forms.

If the case is not most urgent, the patient is put to bed, the diet restricted to liquids, and belladonna, combined with small doses of calomel, administered. At the same time copious injections should be given two or three times daily, but purgatives and opium are to be avoided. Should the symptoms be urgent from the commencement, or the treatment fail, an operation has to be faced.

Intussusception.

Intussusception is the protrusion or invagination of one part of the intestine into another lower part—the upper part slips into the lower part. With part of the intestine enters also a certain portion of the mesentery; and it is to the constriction of the vessels contained therein, and later on possibly to the complete obstruction, that the more urgent symptoms are due, e. g., gangrene, perforation, or rupture of the gut.

The **Cause** of intussusception is irregular and violent peristalsis, however induced, whether by the presence of irritating food, or by the existence of tumors, or possibly worms; the presence of hard masses of feces may also lead to its occurrence. In a few cases injury, e. g., blows on the abdomen, or severe strains during jumping, have been responsible for its onset.

The **Symptoms** vary according to whether the condition is acute or chronic.

Acute Intussusception occurs most frequently in young children, the onset being usually sudden. The child is attacked with severe pain, possibly just in one spot and more or less paroxysmal at first, but rapidly becoming continuous and spread over the abdomen. This is followed by vomiting. The patient rarely suffers from absolute constipation, diarrhea and the discharge of blood-stained slime, perhaps associated with straining being common. Collapse soon supervenes, and in the worst cases this may be so severe as to kill the patient within twenty-four hours; otherwise a fatal issue from ex-

haustion or peritonitis is reached within a week, unless relieved by operation. On examining the abdomen, but little distension or tenderness is noted, unless acute peritonitis is present; in about half the cases a distinct tumor can be felt, cylindrical in outline, sometimes sausage-shaped, but there is often no lump to be found at all.

A natural cure occasionally occurs, resulting either spontaneously or from sloughing of the inner part. When the latter occurs, the subsequent condition is not very satisfactory, owing to the formation of a stricture.

Chronic Intussusception occurs more frequently in adults than in children. The onset is gradual and the course varies widely in different cases. There are intermittent attacks of pain of a colicky nature, which recur at intervals, the attacks becoming more frequent and prolonged. The bowels are irregular in their action, and there is sometimes a blood-stained mucous discharge. The general condition is not at first much affected, but as the case progresses emaciation and general weakness may come in.

Treatment.—In the most acute forms of the disease but little can be done, owing to the extreme prostration of the patient; but in the less severe and in the chronic cases much can be attempted to prevent a fatal issue. Only a doctor can decide what to do in each case and he should be called at once. In the meantime put the patient to bed and keep him quiet.

Ischio-Rectal Abscess.

Suppuration beside the rectum is very frequently met with. It commonly results in a fistula. It may arise from a variety of causes.

1. **Acute Ischio-Rectal Abscess** is due to infection of the loose fatty tissue filling the space between the rectum and the ischium (or lower part of the hip bone; it might well be termed the "sitting bone"). The abscess may be due to the "colon bacillus," which is always present in the large bowel. It may get through the wall of the bowel as a result of penetration by a fish-bone or other foreign body, or some form of ulceration; in consequence the pus has the usual characteristic offensive odor of feces. If the infection is through the skin the pus has no objectionable smell. A red, painful swelling is noticed on one side of the anus, which is at first hard and brawny, but soon becomes soft and fluctuating. Bowel movements are exceedingly painful, and the patient is unable to sit with any comfort. If left to itself, it may burst internally or externally, or in both directions, and a fistula-in-ano is very liable to follow. **Treat-**

ment.—In the early stages the part should be well fomented with hot water, but when there is no doubt that pus is forming, a free opening should be made, the cavity washed out, and stuffed with some antiseptic dressing. If taken early enough, rapid recovery may ensue without the bowel becoming involved, but when its lining has been perforated the wound will not heal without an operation.

2. **Chronic Ischio-Rectal Abscess** is usually met with in run-down or tubercular individuals during young adult life, and is not unfrequently a complication of phthisis. It arises from injuries to the skin or bowel, and may even be brought on by exposure to wet or cold, as by sitting on a damp stone. The **Signs and Symptoms** are those of a chronic tubercular abscess. A hard and painless mass may be first felt, and this slowly spreads, softens, and is transformed into a more or less extensive abscess sac. The **Treatment** is as for all tubercular deposits, viz., in the early stages, and even before suppuration has occurred. Where extensive sinuses or fistula exist, treatment as for fistula-in-ano or operation is necessary.

3. Suppuration beside the rectum may occasionally be due to disease of neighboring or distant structures, e. g., the hip joint, the spine, prostate, etc., the pus finding its way down by the side of the rectum to reach the surface.

Fistula-in-Ano.

Fistula-in-Ano is a condition in which suppurating tracks or canals are formed in the neighborhood of the anus and the lower end of the rectum. Many of these are merely **sinuses** in that they have but one opening. See figures.

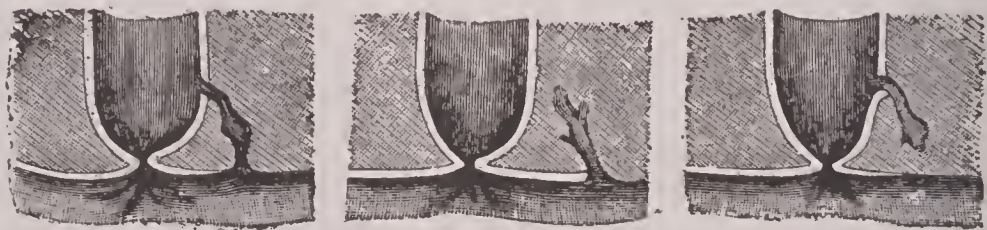


Fig. 299.

Three forms of fistula-in-ano. I is complete; II is an external blind, and III an internal blind fistula.

The **Cause** is usually an ischio-rectal or anal abscess, in the neighborhood of the bowel; but it sometimes arises as the result of a stricture of the gut.

It is very difficult to obtain healing, owing to the state of unrest in which the parts are kept by the continuous movements, voluntary

and involuntary, of the sphincter; hence an operation to divide this muscle is almost always necessary. It may, however, be advisable to leave the case alone when the fistula complicates the **later** stages of phthisis, or when a small blind internal fistula exists in elderly people, causing but little inconvenience and no injury to the general health.

Fissure of the Anus is a most painful and troublesome complaint, met with most commonly in women of a nervous temperament, or in individuals whose health has been broken down by long residence in the tropics. It is occasionally due to injury, but more often to the passage of large, hard masses in patients suffering from chronic constipation.

The **Symptoms** of this condition are very distressing, consisting of burning pain during defecation, which often lasts for some hours. The pain is usually associated with straining, and may extend down the thighs or up the back, and not uncommonly to the side of the back of the pelvis; it may be so severe as to lead the patient to refrain from moving the bowels for prolonged periods. The feces may be streaked with blood or pus, and there is a certain amount of discharge from the anus. The sphincter (or ring muscle) is spasmodically contracted, and the entrance of a finger is forcibly resisted.

Treatment is, in the earlier stages, undertaken by regulating the action of the bowels by suitable laxatives, by the use of cocaine suppositories prior to defecation, and by improving the general health. In confirmed cases an operation to stretch the muscle is necessary.

Cancer of the Rectum occurs usually only in elderly people. The **Symptoms** of the disease are often so slight and the onset so insidious as to raise no suspicions of the existence of any growth until it has attained considerable size. It then leads to recurring attacks of constipation, alternating with diarrhea, and to the discharge of large quantities of mucus, often blood-stained. A sense of weight or dragging pain is noticed in the rectum, and the patient after defecation feels as if there is still something to be passed. This sensation increases until true tenesmus and straining at stool is present, together with constant pain, which may radiate up the back and down the legs, causing sitting on any hard substance to be painful. At first a blood-stained discharge may be seen on the feces (which become flattened and pipe-like), but later on it passes independently of the motions. Examination is generally painful, as also defecation, and sometimes the patient abstains from the latter for lengthened periods on account of the exquisite agony caused thereby. Marked cachexia or wasting away results, the digestion becomes impaired,

any meal causing pain and flatulent distension; natural sleep is impossible.

The case runs a more or less rapid course to the fatal issue, which on an average ensues about seventeen months after the onset of symptoms, if no operation has been undertaken.

The **Treatment** of cancer of the rectum consists in an operation to remove the mass, or make an artificial anus.

Hemorrhoids, or Piles.

Piles are a varicose or greatly enlarged condition of the veins surrounding the anus and lower inch or two of the rectum. The veins of this region are very prone to become varicosed. Their position at the lowest part of the bowel, together with the absence of valves, and the fact that they constitute the only communication between the portal (or liver) and general systems, and thus afford the only means of escape from a blockade on the portal trunk—all these reasons may be looked on as **Predisposing Causes**. In addition to these are a sedentary occupation, alcoholic excess, and chronic constipation, which, by leading to congestion of the liver, are frequent forerunners of piles. They are exceedingly common in young people, especially in men about twenty years of age forced to lead a sedentary life; up to middle age the tendency diminishes, but in elderly individuals many conditions arise which tend to produce them. Young women are remarkably exempt from piles, owing probably to the regularity of the menstrual discharge; but pregnancy, displacements, or tumors of the womb, which cause obstruction to the veins, are liable to be associated with them.

A varicose condition of the veins in the neighborhood of the anus is often present without being recognized by the individual; but many different circumstances may bring the symptoms into prominence, such as the use of drastic purgatives, especially aloes, local exposure to damp and cold, as by sitting on a cold wet stone or in a draughty closet, or sudden congestion of the liver, as by alcoholic excess, or a chill.

Two chief varieties of piles are described, viz., the external and internal; but frequently a combination of the two conditions is present.

External Piles are found at the margin of the anus, and are partly covered with skin. In the usual relaxed state in which they are found they give rise to no **Symptoms** beyond a little itching, and perhaps a sense of fulness and irritation immediately before and after defecation.

They are very liable, however, to become **inflamed** from local irritation or cold, and then appear as tense, bluish, rounded swellings, exceedingly painful and tender, and often preventing the patient from walking or sitting in comfort. This is known as an "attack of piles." In such a state the vein contained in the pile is distended with blood-clot. Under suitable treatment the swelling subsides in a few days, usually leaving the fleshy fold more bulky and harder than before.

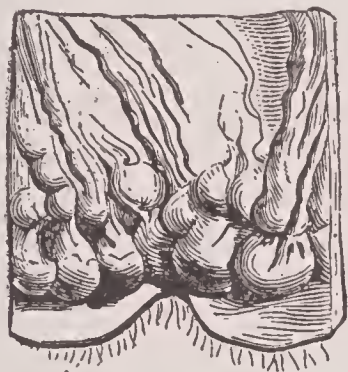


Fig. 300.
Internal hemorrhoids or piles,
which are varicose veins of the
rectum.

The **Treatment** of external piles, when uninflamed, is very simple. Constipation must be relieved; the parts should be kept clean and well washed; a witch-hazel ointment or extract may be occasionally applied, and great care taken not to irritate the anus after defecation by the use of hard paper (e. g., newspaper). Very soft curl-paper, well crumpled, should be employed, or even preferably absorbent cotton. It is but rarely that **operation** is called for in a simple case of external piles.

Internal Piles consist of dilated veins held together by a certain amount of connective tissue, and covered by mucous membrane. The condition is limited to the lower two inches of the bowel. There is a certain amount of mucous glairy discharge, and the feces may be streaked with blood; but, as a rule, the hemorrhage is not great. Such a condition is usually followed by a definite formation of piles and not unfrequently runs on to prolapse of the rectum.

The **Symptoms** arising from internal piles are often not very marked until hemorrhage occurs; but there is usually a sense of weight or fulness about the anus, with sometimes pain, which is increased before and after defecation. The patient feels as if a foreign body were present in the bowel, and the mass not unfrequently protrudes, giving rise to much pain and inconvenience owing to the grip of the sphincter muscle until replaced by the patient. Sooner or later hemorrhage is almost certain to be noticed, coming on at first after defecation, and only a few drops being lost. After a

time, however, the flow increases, and may continue to such an extent as to cause marked anemia. If the case remains untreated, the pain and inconvenience increase; a blood-stained mucous discharge from the rectum is noticed, soiling the clothing; reflex irritation of neighboring organs is produced, and a condition of nerve prostration from pain and hemorrhage may result. In cases where the piles result from portal obstruction, as in hardening of the liver, the bleeding may be beneficial, and must not always be checked. Moreover, when the menstrual flow is diminished, a vicarious (or substituted) discharge of blood from the piles sometimes occurs.

Complications of Piles.—Inflammation of the veins in piles leads to what is popularly termed an “attack of piles.” This is much less common with the internal than the external variety. There are painful distension and swelling of the parts, which become blue in color and exquisitely sensitive. They subside with or without suppuration; in the latter case a spontaneous cure may result, whilst in the former general blood contamination may follow, death from poisoning having occasionally occurred. **Strangulation** of the piles by the sphincter muscle may follow protrusion of the piles if not reduced (i. e., replaced), the mass then becoming painful, tense, swollen, and livid in color; inflammation running on to ulceration and even sloughing follows, the patient suffering meanwhile from sickness, pain, and absorption of poison. Pyemia is likely to ensue unless the case is effectively treated, as also septic inflammation of the branches of the portal vein in the liver. On the other hand, a spontaneous cure may be effected. **Prolapse** may become chronic, and **fissure** of the anus develop.

It is important to remember that blood may be passed in many other conditions besides piles. In the latter case the blood is of a bright red, florid color, and often coats the feces, whereas if it originates higher in the intestinal canal it is dark or tarry in color, and is more intimately mixed with the excreta. An examination of the rectum by a doctor will also in the latter case show the absence of piles.

General Treatment consists in removing all possible sources of venous congestion, in regulating the bowels and assisting the liver. The latter may be effected by the judicious use of natural mineral waters, such as Hunyadi Janos and Friedrichshall, or the use of some such mild aperients as the confections of senna and sulphur, or castor-oil. These may be given daily, whilst the food and drink of the individual are regulated, all excess of alcohol being avoided, and

suitable exercise taken. In weakly and debilitated individuals it is advisable to adopt a more stimulating and tonic plan of treatment. Aloes should generally be avoided. When dependent on the pressure of a pregnant uterus but little more than attention to the regular action of the bowel can be done until the child is born.

Local Treatment in the earlier stages consists merely in **palliative** measures. Thus, the parts must be protected from injury and cold; only soft paper or cotton-wool used for cleansing after defecation; and, when protruding, the piles should be sponged with cold water and gently reduced by steady pressure on them. An ointment containing an extract of witch-hazel, or the injection of a hazeline lotion (1 in 8) is also advisable, and bleeding from piles can often be arrested by this means. The ointment of gall and opium is recommended, but it is not so efficacious.

When there is much pain or bleeding, and the piles have attained some size, **Radical Treatment** by operation is necessary.

Prolapsus Ani and Recti (Falling of the Anus and Rectum).

A certain amount of slipping down of the mucous membrane or lining of the bowel is a constant and normal accompaniment of the act of defecation; if, however, this becomes abnormally increased, the

Fig. 301.
Prolapse or "falling" of the
bowel. X is a space lined by
peritoneum.



condition may be maintained after the evacuation of the bowels, constituting prolapse. At first only the mucous membrane (or the lining) is protruded, and this is known as an incomplete prolapse, or **prolapsus ani**; if, however, the condition persists, the whole thickness of the bowel may become involved (mucous membrane, submucosa, and even the muscular and peritoneal coats), giving rise to a complete **prolapsus recti**. The former condition is more commonly met

with in adults, and the latter in children; but it must be understood that the latter is always preceded by an incomplete stage, limited to the mucous membrane, and that in adults a complete prolapse is occasionally observed.

Causes.—1. It may be produced by a simple relaxation of the tissues, as in weakly individuals. 2. Conditions which have led to chronic diarrhea, rectal irritation, as from worms in children, or diseases of neighboring organs, such as stone in the bladder, stricture, enlarged prostate, may also determine prolapse.

Symptoms and Diagnosis.—There is a smooth rounded swelling at the anus, red or purplish in color, covered by mucous membrane; this protrusion in the early stages can be readily replaced by a little pressure, but returns if the patient strains or coughs. When the swelling is of large size, replacing it is increasingly difficult and painful, and it is very liable to become inflamed and ulcerated from friction. Incontinence of feces is also a common result. Where the whole thickness of the gut is protruded, the peritoneal covering may accompany the tumor, and into the sac thus formed small intestine may pass, and even become strangulated. The prolapse itself may also be constricted if allowed to remain for long unreduced; the mass is then livid, swollen, and intensely painful, and if left to itself may slough away, and thus lead to a spontaneous cure, although severe septic symptoms may come on, and even fatal peritonitis.

Treatment.—In the earlier stages, all that is needed is the removal, if possible, of the cause of the straining, e. g., dilatation of a stricture of the urethra, removal of a stone in the bladder, or the regulation of the bowels so as to check either chronic diarrhea or constipation. When piles are present, they should be treated as described above, and the prolapse will, as a rule, subsequently disappear. Threadworms must be dealt with by suitable means. Beyond this, cold or astringent injections may be employed, and it is advisable for the individual to acquire the habit of having the daily motion at bedtime. The prolapse is then carefully washed, reduced by pressure with oiled fingers, and retained by strapping the buttocks together, particularly in children, or by applying some suitable pad and a T-bandage. The great hope of obtaining a cure in this way consists in **never allowing the prolapse to remain unreduced for any length of time.**

When such palliative measures fail, **Operative Treatment** must be undertaken.

Surgical Diseases of the Kidneys, Bladder and Urethra

Floating and Movable Kidney, Stones in the Kidney, Inflammation of the Bladder, Malignant Disease of the Bladder, Various Disorders, Retention of Urine, Urinary Deposits, Stone in the Bladder, Enlarged Prostate Gland, Stricture of the Urethra.

Subject Reference

For Venereal Diseases, see pages 237-246.

For Medical Diseases of the Urinary Organs, see pages 420-426.

Floating and Movable Kidney.—The term **Floating Kidney** has been applied to a supposed congenital condition in which the organ is attached to the posterior wall of the abdomen by a peritoneal ligament; it is, however, more than doubtful whether such an abnormality really exists. By **Movable Kidney** is meant an acquired condition in which the kidney moves within the fatty tissue which forms a loose capsule around it. It occurs more frequently in women than in men, and more often on the right than on the left side, partly because the renal vessels are longer on this side than on the other.

Causes.—Parturition accounts for many cases, firstly because of the sudden lessening pressure within the abdomen, and secondly owing to the resulting relaxed state of the abdominal muscles, especially if the patient gets about too early, or undertakes physical work without proper external support. Hence, it is more frequent among the poor than amongst the rich. It may also follow the removal of large abdominal tumors or rapid emaciation; whilst tight-lacing or mechanical injuries may be responsible for some cases. It is frequently associated with that form of displacement downwards of the abdominal organs which is known as enteroptosis. This is probably due to accumulation of feces in the transverse colon, whereby the peritoneal ligaments become stretched, and in consequence the intestines, stomach, and even the liver, may slip downwards and become movable. The right kidney takes part freely in this displacement.

The **Symptoms** arising from a movable kidney consist chiefly in pain referred to the back, or perhaps shooting along the ureter to the groin or private parts; it is increased by pressure on the abdomen. Vomiting is a significant sign, and the loins should be carefully examined in cases of obstinate vomiting with no apparent cause. Periodical increase of these symptoms, with a temporary diminution in the amount of urine, sudden relief, followed by an increased flow

of urine possibly containing some slimy pus, indicates that the organ has returned to its normal situation. On examining the abdomen, a movable tumor can often be observed with ease if the abdominal walls are not too fat.

Treatment consists in wearing an abdominal belt, suitably padded, or in operation.

Renal Calculus.—**Renal Calculi** or **Stones in the Kidney** are usually met with in individuals who pass sand or gravel in the urine. All renal solids under ordinary circumstances are sufficiently small to find their way into the pelvis of the kidney, and thence along the ureter to the bladder. If, however, they are obstructed in their onward course, either on account of their size or shape, or any narrowing of the tubules, they may become lodged in the kidney substance, and by the gradual deposit of the same material increase in size until large enough to give rise to symptoms. Renal calculi are not often of great size, rarely exceeding that of a Barcelona nut; occasionally, however, the whole of the pelvis (or hollow of the kidney) may be occupied by a concretion, which takes the shape of the cavity in which it lies.

The typical **Symptoms** arising from renal calculus are as follows: The patient complains of pain in the loin, more or less persistent, and often paroxysmal in nature, which is, however, always increased on exercise or jolting; it is frequently referred to (that is, felt in) distant regions, but most commonly gives rise to pain in the front of the thigh, accompanied by retraction (or raising) of the testicle; in the female it is also experienced in the labium majus. Sometimes it extends down the back of the thigh, and it has even been said that pain in the heel is a sure sign. It is almost invariably associated with blood or pus in the urine, the amount of blood or pus being increased on exertion. Frequency of micturition is a prominent symptom. It is an undoubted fact that stones even of large size may exist for years in the kidney without giving rise to any symptoms whatever.

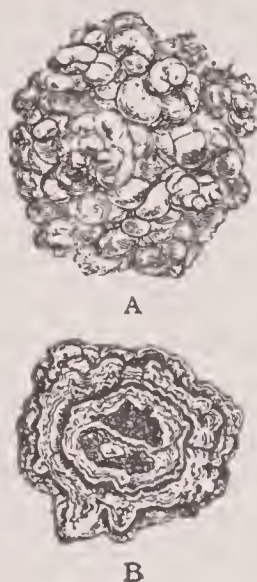
The passage of a calculus down the ureter causes the symptoms known as **Renal Colic**. They consist of excruciating pain of a paroxysmal nature, which comes on suddenly, and is felt both in the loin and in the front of the thigh. It is always associated with vomiting and severe shock, the patient often lying on the floor writhing in agony, with cold perspiration standing in beads on his forehead. The temperature is subnormal, and the pulse weak and rapid. The patient suffers from frequent paroxysmal efforts to pass water, but only succeeds in evacuating a small amount, and that generally

blood-stained. After lasting for a variable period, the pain suddenly ceases, as a result of the passage of the calculus into the bladder, or of its slipping back into the pelvis of the kidney.

The **Diagnosis** of renal calculus is often a matter of uncertainty when there is no history of the passage of gravel, or of the occurrence of renal colic. It is most likely to be mistaken for tubercular disease. Some assistance may perhaps be obtained by the use of the X-rays.

Fig. 301. Urinary calculus, or stone-in-the-bladder. *A* shows the rough surface. *B* shows the structure. The layers in *B* show how the stone increases in size. This one is formed of oxalate of lime and is very hard.

Similar deposits may form in the kidney, known then as "renal calculus."



Treatment.—In the early stages treatment is directed to the cure of lithiasis. The patient's diet and general habits of life must be suitably regulated, and alkaline purgatives, such as Carlsbad or Vichy waters, or citrate of lithia and sulphate of soda may be given in a mixture. Plenty of bland fluid should be ordered, such as boiled or distilled water, in the hope of dissolving the stone or assisting its onward passage to the bladder. Sometimes it may become encysted, if the patient is kept absolutely at rest; the symptoms will then gradually ameliorate, and finally disappear.

Attacks of renal colic are treated by the use of hot hip baths, warm drinks, and hypodermic injections of morphia; in the more severe cases chloroform must be administered.

Inflammation of the Bladder.

Acute Cystitis, or inflammation of the bladder wall, results from:

(i) Cold in gouty subjects; in fact, there are certain individuals who often "take cold" in their bladders, instead of in their nose or bronchial tubes. (ii) It is sometimes due to mechanical causes, e. g., the presence of foreign bodies, such as stone. (iii) It occurs most frequently as a complication of gonorrhea, owing to an upward exten-

sion of the inflammation, and in such cases the symptoms are often very severe. (iv) It may result from the taking in by the body of irritating poisons, such as cantharides (Spanish fly). (v) Septic cystitis may come on if a dirty catheter or sound is introduced, and there can be but little doubt that this was a most prolific source of the mischief in times past; it is especially likely to occur when the bladder is paralyzed in cases of spinal injury.

The **Symptoms** consist in pain in the perineum and lower part of the abdomen, together with tenderness on pressure over the middle of the bone at the lower limit of the front of the abdomen. This is accompanied by extreme irritability of the bladder, frequent efforts of a painful and spasmodic nature being made to pass water; but little urine is voided at a time, for as soon as any amount has collected it is ejected forcibly. It generally contains blood and pus, soon becoming alkaline, and teeming with bacteria. Some amount of fever is usually present, as also vomiting, whilst spasm or straining of the rectum may be induced as a result of the nearness of the rectum to the inflamed bladder. The usual termination of the case is to get well, but sometimes chronic irritability may persist.

Treatment.—The patient should be kept in a warm atmosphere, and preferably in bed, and hot fomentations applied to the lower part of the abdomen; hot hip-baths twice daily, maintained for some time, are very advantageous. The diet should be restricted to fluid, and the patient allowed to partake freely of barley-water and other bland liquids. A doctor must be consulted.

Chronic Cystitis is much more common than the acute variety. The **Symptoms** are those of irritability of the bladder, the patient constantly desiring to pass water, and having to rise at night, perhaps several times, for this purpose. The urine becomes turbid, and on standing deposits a variable amount of mucus or muco-pus, and a granular sediment. It is usually alkaline, perhaps foul-smelling and ammoniacal, containing an abundance of micro-organisms. There is often but little pain, though when a calculus exists, or the neck of the bladder is ulcerated, pain may become a prominent symptom. The patient's general health is not at first affected, but if the symptoms persist it soon becomes impaired.

The **Treatment** of chronic cystitis is naturally directed towards its cause if such can be discovered; thus, calculi or foreign bodies should be removed, and strictures dilated. In most cases, even where the cause is not apparent, great benefit will be derived from washing out the bladder.

At the same time that this local treatment is being carried out, the patient's general habits of life must be regulated. The diet should be bland and unstimulating; alcohol is better avoided, but if essential for other reasons, well-diluted gin or whisky may be given. Tea and coffee should be prohibited, whilst a milk diet is perhaps the best which can be employed. As to medicines, perhaps salol, boric acid, or benzoic acid may be of some assistance.

In cases which do not improve, and if the patient is becoming exhausted from the constant interference with his rest, etc., the only means of treatment left is that of operation.

The bladder is also sometimes the seat of tuberculosis, simple ulcers or tumors of various kinds.

Malignant Disease of the bladder may originate in that organ, or may spread to it from the rectum or neighboring organs.

The **Symptoms** vary somewhat in these two forms, although the conspicuous features of each are bloody urine and irritability of the bladder. A severe attack of bloody urine, unaccompanied by pain, is usually the first symptom of importance, and may be induced by some injury which causes a crack or fissure in the growth. After one or more of such prolonged attacks, cystitis usually follows, and the subsequent history resembles that of the harder and more rapidly growing tumors. Painful micturition and severe pain in the bladder and perineum are complained of, and the urine early becomes alkaline and putrescent.

The course of the case is similar to that of a somewhat rapidly growing carcinoma, leading to early and marked cachexia, increased by the sleeplessness resulting from the bladder irritation.

When once a diagnosis has been established, removal by operation is the only plan which holds out any hope to the patient, and such can only be undertaken with any prospect of success in benign growths, or in the very earliest stages of the superficial form of malignant disease.

Where removal is impracticable, it only remains to ease the patient's sufferings by means of morphia, the bladder also being occasionally washed out; but where the irritability is very great, a permanent artificial opening may have to be made.

Disorders of the Bladder.

Incontinence of Urine.—A patient is suffering from incontinence when the urine escapes involuntarily, dribbling away either constantly or intermittently.

1. **Active Incontinence** is often present in young children, mostly boys. It results from some condition of increased excitability of the urinary apparatus; in other instances, it is probably due to weakness of the sphincter muscle of the bladder (the ring-like muscle which keeps the bladder closed), which is unable to resist the pressure of even a small amount of urine. The chief causes of irritation are a narrow foreskin, worms in the rectum, a polypus (soft growth) in the rectum, or urine that is much concentrated or irritating. The affection is most obvious at night, and, indeed, may occur only during sleep; it has been known to persist till adult life is reached. Somewhat similar in nature to this is the irritability of the bladder induced by calculus, inflammation, or ulceration, where frequent calls to micturition are experienced; to this, however, the term "irritability of the bladder" is applied, "incontinence" being only used where no active disease of the bladder is present.

Treatment of the nocturnal incontinence consists in the removal of all sources of irritation, such as a tight foreskin, whilst the child is waked from sleep at regular intervals in order to pass water, so as to break him of the bad habit. Tonics, such as iron, arsenic, and quinine, may be administered, and tincture of belladonna in full doses should also be given.

2. **Passive Incontinence** is present when the neck of the bladder is relaxed, so that as soon as any urine is secreted, it flows out of the urethra, the bladder in this way never becoming distended. It arises mainly from two causes: (a) **Paralysis** of the sphincter, as a result of some injury or disease of the spinal cord. Thus, in severe shock the urine is unconsciously evacuated from relaxation of the sphincter; but if the spinal cord is not compressed or destroyed, the function is soon regained.

3. **False Incontinence, or Distension with Overflow**, is a condition in which the outflow of urine is impeded to such an extent that a certain quantity is left in the bladder after every act of micturition, although the patient imagines that the organ has been completely emptied. This so-called **residual urine** gradually increases in amount until the bladder becomes filled, and some of it dribbles away involuntarily and wets the patient's clothes. This condition is usually met with in patients with neglected stricture or enlargement of the prostate. Treatment must be directed to keeping the bladder emptied by the regular use of the catheter, but it often remains in a weak state for some time.

Atony or Weakness of the Bladder is the term given to a condition

in which the patient is unable to expel its contents, not in consequence of any true paralysis of the muscular walls, but simply from loss of tone. The most usual causes are: (1) Chronic overdistension, the result of obstruction to the outflow, owing to enlarged prostate or stricture, as just described. (2) A single prolonged voluntary or involuntary overdistension; for instance, owing to the refusal of a teacher to allow a boy to leave the room. (3) It occasionally follows cystitis, especially that due to gonorrhea. (4) In old age atony is occasionally due to simple loss of nerve tone.

In the slighter cases all that is noticed is some hesitation or difficulty in commencing the act of micturition, whilst the flow of urine is weak, and cannot be efficiently completed, a few drops dribbling away afterwards. In worse cases a considerable amount of residual urine may be left in the bladder, and this may lead to chronic distension with overflow, and by its decomposition to chronic cystitis. In other cases actual retention may be induced. The **Treatment** should be to remove any source of obstruction which exists. Regular use of the catheter two or three times a day will prevent any distension of the bladder. The administration of strychnine, phosphoric acid, and other tonics will improve the expulsive power of the bladder.

Retention of Urine.—When a person is unable to expel the contents of the bladder, so that it becomes distended, **retention** is said to be present. Speaking generally, one may state that the most common cause of retention in infants is phimosis; in children, impacted calculus, or a ligature around the penis (narrow foreskin); in young men, gonorrhea or one of its complications; in young women, hysteria, or foreign bodies in the bladder; in adult men, stricture; in adult women, some uterine condition; and, in old men, hypertrophy of the prostate.

If left unrelieved the urine accumulates, and the bladder becomes distended, giving rise to much pain and discomfort. One of two conditions* is certain to follow: (a) In cases of retention from stricture the dilated urethra behind the obstruction bursts or gives way, resulting in escape of urine into the tissues. If, however, the bladder wall is weakened, rupture of it may follow. (b) When the retention arises from atony or paralysis, or from some obstruction which can be to some extent overcome, distension with overflow is produced.

Inasmuch as retention is merely a symptom, the **Treatment** necessarily varies with the cause.

Abnormal Conditions of the Urine.

1. **Urinary Deposits.**—Uric or lithic acid may occur in the urine in the form of "cayenne-pepper" granules, usually known as "gravel."

Urates or **lithates** are of frequent occurrence in the urine, being met with in the form of a deposit of granules of variable color, according to the amount of urinary pigment present, and this is often known as a brick-dust sediment.

A deposit of uric acid or urates is either a temporary condition dependent on some trivial derangement of the system, or may be constantly recurring and due to too great use of nitrogenous food, such as lean meat, eggs, cheese, etc.; too little fresh air and exercise, or imperfect digestion, the result of some liver derangement. It is also noted in conditions where great using up, or destruction of tissue is occurring, as after violent exercise or in fevers. When such a tendency is continually present, the patient is often said to be suffering from **Lithiasis** or **Lithemia**. Should the individual be incapable of eliminating (or getting rid of, getting out of his system) the material thus formed, an attack of gout or rheumatism is likely to come on.

The **Treatment** of lithemia or lithiasis consists mainly in attention to personal hygiene. The patient's diet must be regulated, all sweets, pastry, and alcoholic stimulants being avoided (with the exception, perhaps, of a little whisky well diluted with lithia or potash water). Regular habits must be followed, and plenty of outdoor exercise indulged in. The liver must also be stimulated, and the bowels regulated by the administration of saline purgatives, especially natural mineral waters (e. g., Friedrichshall, Carlsbad, or Hunyadi Janos), whilst an occasional dose of blue pill or podophyllin is also advisable.

Phosphatic material, when excessive, is voided at the end of the act of micturition, and may give rise to considerable anxiety on the part of the patient, who may mistake it for seminal fluid.

2. **Hematuria** (the admixture of blood with the urine) is due to various conditions.

(a) **Renal** hematuria results from acute inflammation, congestion, calculus, tumors, or injuries of the kidney. The urine is usually deeply colored with the blood, and may be as dark as porter. Blood casts of a fine thread-like form are often observed, and even long sinuous clots, corresponding to the shape of the ureter.

(b) **Vesical** (or bladder) hematuria is due to injury, calculus, tumors, ulceration, or simple congestion of the bladder, with varicosity

of the veins. The blood is always intimately mixed with the urine, but is more abundant at the end of micturition, and clots are not unfrequently present.

(c) **Urethral** hematuria arises from acute gonorrhea, laceration, or the use of an instrument. The blood often flows from the urethra independently of micturition, whilst the first few drops of the stream are also colored.

(d) Hematuria is occasionally of **constitutional** origin, arising from purpura, scurvy, or hemophilia; other evidences of these diseases will be observed, and render the diagnosis evident.

Microscopical examination of the urine should always be made.

Stone in the Bladder.

Varieties.—A vesical calculus or stone in the bladder may be formed of almost any of the solids which are contained in urine.

The **Number** of calculi present in a bladder varies greatly. Sometimes there is only one, but a considerable number, counted perhaps by hundreds, may exist; in such circumstances they are never of great size.



Fig. 303. Urinary calculus or stone-in-the-bladder. This one consists of uric acid deposited in layers. Natural size. Cut in two.

The **Causes** of stone in the bladder must be looked for in some of those constitutional conditions described as predisposing to lithiasis or oxaluria. They are very common in children during the first ten years of life, especially amongst the lower classes, the children of the rich rarely suffering from stone. It diminishes in frequency from childhood to the age of twenty-five, and then gradually increases until it is fairly common in elderly men. The condition is comparatively rare in women. Possibly the character of the drinking water, or the amount drunk, may have an influence. It is exceedingly com-

mon in India and Arabia, a fact which may be explained by the large amount of fluid withdrawn from the body by perspiration.

Symptoms.—The effects produced by stone vary in different individuals. Thus, in children and young adults, where the parts are very sensitive, even a smooth calculus gives rise to severe symptoms, whilst old men often tolerate a large stone without much inconvenience. The patient may have passed “gravel” for a long time, on the cessation of which the symptoms of stone commenced. They consist of pain in the perineum and neck of the bladder, which radiates to the back and down the thighs, but is especially noticed at the end of the penis immediately after micturition. The stone is then pressed down against the sensitive neck of the bladder by the contraction of its muscular walls. Increased frequency of micturition is also present, and perhaps blood in the urine (from the bladder; see Hematuria), though this is not a prominent feature. All these phenomena are increased in severity by jolting, jumping, or any form of exercise, and hence are more marked during the day than at night. Occasionally the flow of urine suddenly ceases before the bladder has been completely emptied, and that some change of position of the body is needed in order to allow him to complete the act. Thus, spasm of the rectum (or bearing down) followed by piles or prolapsus ani, may be induced, especially in children; whilst a hernia may also be caused, and not unfrequently priapism (or marked prolonged erection of the penis).

The symptoms become somewhat modified in **children**, leading to irritability of the bladder, as evidenced by wetting of their clothes and of their beds at night, and pulling at the prepuce and penis. These manifestations are simulated by those produced by a tight foreskin, with which condition, indeed, it is often associated; hence, it is important always to sound the bladder of a child after circumcision.

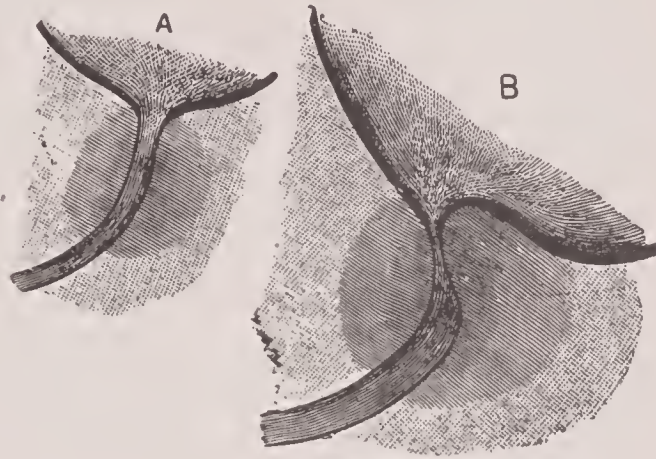
The actual **Diagnosis** of vesical calculus can only be made by **sounding**, that is, inserting a slender metal rod to feel for the stone.

Course of the Case.—A patient suffering from vesical calculus is certain, sooner or later, to develop symptoms of chronic cystitis, and septic changes in the urine are equally likely to follow—possibly as a natural sequence, but more probably as the result of the introduction of septic instruments. The bladder becomes enlarged, and if the stone is not removed, the lining may become ulcerated, and pus in the kidney almost invariably results; the patient’s life is thus destroyed partly by exhaustion and partly by septic poisoning.

The **Treatment** of vesical calculus is by operation. The stone may be crushed by an instrument passed in through the urethra and the fragments then washed out, termed "lithotritry" or "crushing the stone," or it may be removed by an opening into the bladder, so-called "lithotomy" or "cutting for stone."

Hypertrophy of the Prostate is a condition rarely met with, except in patients over fifty years of age. There is a general enlargement of the part.

Fig. 304.
A shows, diagrammatically, the beginning of the urethra or passage out of the bladder, in a normal condition. B shows the same obstructed by enlarged prostate. The shaded part represents the prostate.



The **Symptoms** vary considerably according to the nature and position of the enlargement. The patient at first finds some difficulty in micturition, especially at the commencement of the act; straining often hinders rather than assists. The stream is not necessarily smaller than formerly, but is projected with less force. Gradually irritability of the bladder ensues, and the patient has to pass water very frequently, especially during the night. Some degree of pain and a sense of weight and fulness about the perineum are also experienced, whilst tenesmus, and even hernia, may be subsequently caused by the straining. As the obstruction increases, a certain amount of urine remains within the bladder after each act of micturition. If this condition remains untreated, the bladder becomes distended, the urine dribbling away and wetting the clothes, or decomposition of the retained fluid may follow, and cause cystitis with increasing irritation and muscular spasm of the bladder. Gradually the general health of the patient is undermined by the constant irritation produced by this process, as also by septic absorption, and the final chapter may be ushered in by symptoms of kidney blood-poisoning from the mischief inflicted on the kidneys.

Occasionally the early symptoms may pass unnoticed for a considerable time, the patient imagining that the frequent calls to pass water are good signs rather than evidences of disease. In such cases

the bladder may become over-distended, and the condition unsuspected until, owing possibly to some exposure to cold or over-indulgence in alcohol, complete retention is induced, and then, to the surprise of the patient, an enormous amount of urine is withdrawn with a catheter by the doctor. Priapism is sometimes a troublesome condition, and the effect of this on the moral sense may be very serious, and leads in some cases to acts of gross indecency.

Treatment.—All that is needed at first is regular catheterism, in order to prevent the bladder from becoming overdistended, and this the patient may sometimes be taught to do for himself.

During the first fortnight of catheter life the patient must be carefully guarded from cold and exposure, to avoid the occurrence of constitutional disturbance.

During the continuance of catheter life, the patient must be warned to live quietly, and abstain from all excesses, especially as regards eating and drinking; sexual excitement should be avoided, and horse-exercise forbidden; precautions must also be taken to protect the patient against cold and damp. The use of alkalies internally is most desirable to counteract the acidity of the urine, and thereby diminish the irritability of the bladder.

Under such a system of living it is probable that comparative comfort may be enjoyed perhaps for years, the progress of the affection being entirely checked in some instances. This, to a large extent, depends upon the bladder remaining free from septic contamination, and the patient must realize that such is generally due to infection from without, and hence the most scrupulous care must be taken in sterilizing all instruments before and after use. In other cases the relief is but temporary, and after a time the irritability of the bladder increases to such an extent that operation is absolutely imperative.

Laceration of the Urethra is met with as a result of injury directly to the perineum, as by falling astride a fence, or beam; it has also been caused by severe jolting in the saddle, or by a kick in the perineum.

The **Symptoms** consist of pain in the perineum and shock, followed by great distension of the scrotum from hemorrhage, whilst blood trickles from the orifice of the urethra. If the patient is able to restrain himself from passing water, and is successfully treated, no extravasation (or escape into the tissues) of urine results; if, however, he attempts to micturate, the urine finds its way into the perineal and scrotal tissues. Whether the rupture is complete or

not, a stricture of considerable density is almost certain to follow, and great difficulty is subsequently experienced in treating it.

Treatment.—A doctor must be called at once. An attempt must always be made at the earliest possible moment to pass a catheter into the bladder; when the rupture is incomplete, this may often be accomplished by keeping the point of the instrument against the roof of the urethra. If successful, the catheter is tied in this position for three or four days, until the wound is healed over so that the risk of extravasation will have practically ceased.

Stricture of the Urethra.—Stricture of the urethra is a condition in which the passage of urine is hindered, owing to some change in the walls of the urethra, which prevents them from dilating (or stretching). When urine is not passing the walls of the urethra are in complete apposition (that is, are together). It is only converted into a tube when urine is passing along it. When, owing to some change in the structure of its walls, this dilatation is impracticable, the patient is said to suffer from stricture.

As a rule, no treatment is required beyond placing the patient in a hot bath, and emptying the lower bowel by the use of a large warm enema. If such treatment fails, catheterism by the doctor will be necessary. It must be conducted with the greatest gentleness.

The **Symptoms** of urethral stricture vary according to the case. The patient generally complains of difficulty in the act of micturition, the stream becoming small, and perhaps forked and twisted. It takes a longer time than usual to empty the bladder, and even when apparently successful a few drops of urine may trickle away, wetting the patient's clothes. Irritability of the bladder follows, leading to frequent attempts to pass water at short intervals during the day and night. As the obstruction increases, more and more urine is left in the bladder, which may in time form a tense, rounded, dull swelling in the lower abdomen. The amount of urine trickling away also increases, so that the patient's garments are always wet, giving him an unpleasant urinous odor. A certain amount of gleet discharge is present, whilst if the individual takes an excess of alcohol, or is exposed to wet and cold, complete retention may ensue. Sometimes the onset of symptoms is so unnoticed that retention of urine is the first marked feature in the case.

Treatment can be carried out only by the doctor.

If **retention of urine is present** in a case of stricture, no time must be lost. A doctor must be sent for at once. At an early stage, when the symptoms are not urgent, the patient may be given a hot bath,

and the bowels opened by a warm enema, whilst a moderate dose of opium or preferably a morphia suppository is administered. The urine may be passed naturally in the bath, or a simple operation to empty the bladder may be necessary.

Phimosis, when complete, is a condition in which the prepuce (or foreskin) is so long, and the orifice so narrow, that it cannot be retracted. It is usually **Congenital** in origin, and may exist to such a degree as to render micturition impossible. More frequently the opening is a very small one (pinhole prepuce), permitting micturition, but leading to irritability of the bladder from the obstruction. In such cases the prepuce is usually adherent, and considerable irritation is caused by the retention of the smegma; this may collect and become dried and thickened so as to give rise to definite concretions. The child pulls at the foreskin, owing to the itching produced, and thus the symptoms of stone in the bladder may be simulated. Attacks of inflammation of the foreskin are also frequent. If allowed to remain untreated long, distension of the bladder, or even of the kidney, may result. Not only is this condition in itself a cause of irritation and even danger to the individuals affected, but it is often provocative of masturbation, whilst it tends to aggravate the symptoms of venereal disease, and there is but little doubt that it acts as a predisposing cause to cancer of the penis.

The **Treatment** of phimosis consists in circumcision.

Circumcision should always be performed, on children with a long prepuce, within the first year of life, since at that time the parts are but slightly developed, the operation is a trifling one, and but little inconvenience is subsequently experienced; the longer it is postponed, the more troublesome does it become.

Epithelioma (cancer) of the penis rarely arises except in patients who are the subject of congenital phimosis or long foreskins, and hence it is stated that the disease is unknown amongst the Jews.

INSTRUCTION TWENTY-EIGHT—*Diseases of the Testis*

Diseases of the Testicles

(*Genital Gland of Male*)

Subject Reference

For Venereal Diseases, see pages 237-246.

For Medical Diseases of the Urinary Organs, see pages 420-426.

Retention of, Unnatural Position of, or Misplaced Testicle, Injury, Inflammation, *Hydrocele*, *Varicocele*.

The testicles are not developed in the scrotum, but from the posterior wall of the abdominal cavity, and they lie at first behind the peritoneum close to the kidneys.

Incomplete Descent or Retention of the Testis.—The testis may either remain in the abdominal cavity attached to the posterior abdominal wall, or, more frequently, it remains just within the abdomen; whilst most commonly it occupies the inguinal canal, or lies just outside of it. The organ in the latter position is freely mobile, being readily pressed up towards the abdominal cavity.

The condition is easily recognized by the absence of the testicle in the scrotum, whilst in the last mentioned variety the organ can usually be detected as a small movable swelling about the size of a horse-bean, giving the characteristic testicular sensation on pressure. The scrotum on the affected side is imperfectly developed.

In any of these varieties a late descent of the testis may occur, usually accompanied by a congenital hernia.

Malposition of the Testis.—The testis may take some other course than the natural one, and lodge under the skin in the perineum or in the upper part of the thigh.

In all cases of retained or misplaced testis the organ is small and wasted, and probably useless.

Complications of a Retained or Misplaced Testicle.—Such a testicle is apt to be hurt often and may become cancerous.

Treatment.—Taking into consideration the discomfort occasioned by this condition, as well as the risk arising from the tendency to malignant disease, there can be little doubt that the best method of treatment is the removal of the testicle.

Injuries of the Testis and Cord.

Contusion (Bruise) of the Testis is a very common form of injury. It arises from blows, kicks, squeezes, and the like, and is always

associated with immediate pain of a most sickening and intense character, which is not only experienced in the testicle, but also extends towards the loins and back, and down the front of the thigh. Severe shock accompanies the pain, and may be so profound as to cause death. A well-marked inflammation of the testicle often follows, and this may in turn induce atrophy or wasting away of the organ, although the same result may occasionally occur without much evidence of inflammation, being then possibly due to plugging of the blood vessels. **Treatment** consists in keeping the patient lying down with the scrotum well raised, and in applying hot fomentations or evaporating lotion.

A localized collection of blood in the covering of the testis is a common result of injuries.

Orchitis (Inflammation of the Testicle) most frequently results from injury, but it also occurs in gouty and rheumatic individuals, apparently arising spontaneously; or it may follow mumps or other eruptive fevers.

Symptoms.—The testicle becomes enlarged, exceedingly painful, and tender to the touch. Its shape is more or less globular. The pain is of a peculiar character, tending to produce vomiting, and extending upwards along the course of the spermatic cord towards the back and loins. The skin of the scrotum becomes red and swollen. Considerable constitutional disturbance accompanies the process, the temperature being elevated two or three degrees, whilst vomiting and constipation are marked symptoms.

The **Treatment** consists in keeping the patient in bed, with the scrotum supported on a small pillow. Hot fomentations are assiduously applied, except when the treatment is begun very early, when an icebag may be employed. Pain, if severe, may be mitigated by a hot sitz-bath, and a doctor must be called.

Hydrocele.

Any collection of fluid, other than pus or blood, in the neighborhood of the testis or spermatic cord, is termed a **Hydrocele**. The fluid is clear and watery.

Acute Hydrocele occurs in conjunction with acute inflammation of the testis. The amount of fluid is never abundant.

Acquired Hydrocele is the most common. **Causes.**—It may arise without any evident cause in middle-aged persons. In the majority

of cases the testicle is swollen and perhaps in a state of chronic inflammation, and its covering thickened.

Signs.—Hydrocele appears as a rounded, pear-shaped swelling in the scrotum, which extends for a variable distance upward. Consult your own doctor or the best regular doctor you can go to. **Do not go to one who advertises to treat private diseases.** All such doctors are charlatans and will charge you much more than your home doctor who can give you much better advice and treatment.

Hydrocele of the Cord may occur as a watery sac either at one part or all along the spermatic cord. It is treated by tapping.

Varicocele.

A varicose (or much dilated or enlarged) condition of the veins in the spermatic cord is very commonly met with in young men, but seldom in those of advanced age, except when it has become chronic, or is due to malignant disease (cancer) of the kidney. It usually occurs in individuals with a lax and pendulous scrotum, and is often associated with masturbation. It may also be caused by the pressure of a truss applied for the relief of a hernia. It is almost invariably situated on the left side.

A varicocele gives rise to a soft, irregular swelling in the scrotum, somewhat pyramidal in shape, the main mass being below and slightly overlapping the testis, while the narrow part is upward. It consists of dilated and tortuous veins, the outlines of which can often be seen through the skin; they impart a sensation to the finger which has been likened to a collection of "worms in a bag;" there is a distinct impulse down the veins on coughing. On lying down the swelling almost disappears, owing to the vessels becoming emptied of their contained blood; if pressure is subsequently applied over the lower part of the abdomen on that side and the patient then allowed to stand the tumor reappears, filling from below upwards. A sensation of weight and pain usually accompanies a varicocele, whilst severe neuralgia of the testis may be induced. It is a frequent source of seminal emissions, and may result in wasting of the testis. In favorable cases the condition may after a while spontaneously disappear.

The **Treatment** of slight cases of varicocele consists of supporting the testicle and scrotum by means of a well-fitting suspender (or "suspensory bandage"), whilst the patient is also careful to bathe the parts with cold water every night and morning, and to take measures

to ensure a daily action of the bowels, because constipation is the chief cause of varicocele and tends to make it worse.

Ill-fitting trousers are also injurious. The private parts should always be supported by the front or middle seam of the trousers, by placing the scrotum on one side and the penis on the other side. This is much more comfortable and hygienic than the usual way of "dressing" with the private parts placed wholly to one side of the middle of the trousers.

Radical Treatment by a surgeon, cutting out the veins, is advisable in neuralgic cases, where atrophy of the testis is threatening, or in order to fit the patient for admission into any of the public services.

Unprincipled quacks often work on the fears of young men and exaggerate the danger from varicocele. Offers of advice or treatment by mail are **always** fraudulent. A regular, practicing physician knows how to treat any disease and he is **honest**.

Neuralgia.

In **Neuralgia of the Testis** the organ becomes exquisitely tender and painful, although apparently healthy. It usually occurs in young adults of nervous temperament, or in middle-aged gouty men. It is not uncommonly associated with a varicocele. The pain is usually paroxysmal in character, and very intractable.

Treatment must be directed mainly to the general health, consisting in the administration of nerve tonics, such as iron and quinine, whilst locally sedatives, such as belladonna and aconite, may be applied. It is also advisable for a suspender to be worn.

Atrophy of the Testis results from several causes: (i) It may be due to a congenital arrest of development, as in late descent. (ii) It is most frequently the consequence of inflammatory affections. It occasionally follows the orchitis of mumps, especially in adults; whilst it is also due to syphilitic disease. (iii) It may arise from impaired nutrition, such as the division of the arteries in the operation for varicocele or hernia, or from compression of the cord in the operation for the radical cure of hernia. (iv) Chronic congestion of the organ, as by a varicocele, may induce atrophy; whilst (v) sexual excesses are also stated to lead to it. If unilateral, it is of comparatively little importance; but where both organs are affected, sterility is sure to result.

PART TWO—*Venereal Diseases*

Sex-Hygiene

Personal Purity and the Social Evil

Words of Warning to Boys and Girls

Teaching Facts that Keep the Home Life Pure and Clean from the
Vice Evil, and Preventing Ignorance that Makes Victims
of Our Sons and Daughters

Syphilis—A TERRIBLE DISEASE

Four Hundred and Fifty Thousand Boys in the United States Have
Taken the Fatal Plunge.

INSTRUCTION TWENTY-NINE—*The Social Evil*

The social evil and the consequent venereal diseases owe their prevalence to ignorance. Both these blights that curse the human race can be removed only in one way and that is by the removal of ignorance, by teaching everyone the truth regarding them. A false modesty has prevented publicity of the truth about syphilis and gonorrhea, and so they have flourished in the rich soil of an ignorant people. But now facts that are known must be told. This is the age of enlightenment and the true liberty that knowledge confers. It is education that makes a patriotic, respectable and valuable citizen of the child of the ignorant, dangerous, anarchistic immigrant, and it is only by education and knowledge that we can secure that observance of the laws of health and disease which must be obtained before disease can be done away with. We must recognize the existence of the sexual instinct, a natural and necessary possession for the perpetuation of our race. The policy of silence is responsible for the desolation of many a home and the ruin of many a young girl. Ignorance is the most fruitful cause of criminal abortion, illegitimacy and infanticide—ignorance of things that girls and boys should know and have a right to know. The girl should know the truth about ovulation, menstruation, conception and motherhood. The boy should know the meaning of the sexual instinct, the possibility of continence and purity, the imperative need of morality, and his duty as a man, worthy of the name, toward woman. He should feel

toward every woman as he does toward his mother or his sister. He owes this to himself and must know the truth. These things are of much greater importance and significance in the happiness of each individual and in the welfare of our race than is the influence of alcohol on the health and morality of mankind, although alcohol and immorality are very closely inter-related, yet often having no connection.

Fathers and Mothers Should Have Full Confidence of Sons and Daughters.

A father should have the full confidence of his son, every mother should have the fullest and freest confidence of her daughter—and always this confidence should be from infancy when the child is all-dependent on its parents, is innocent and hides no act or thought. If the parent will look back and consider what he or she should have known as a child, how much they would have been helped to avoid worry and do right and how much more successful they would have been in life if they had had this knowledge. They can safely decide what and how much their child should know. Similarly, consider the future of your child. Boy and girl must grow into manhood and womanhood and learn perhaps at fearful price what you can safely modestly and wisely inform them regarding now. Thus alone can they know where the pitfalls are and how to avoid them. Fortunate indeed is the child of parents who can not afford or do not consent to have their duties as parents entrusted to hired servants or indifferent relatives. If you are a parent stop right now and look honestly at your childhood and your life since. Think also of the coming years and changes in your child's life. Do not shirk your duty because it is hard. If you are in doubt go to the best honest doctor you know and talk it over with him.

The importance of pleasant, healthful, absorbing work and play cannot be too strongly insisted on in these matters of morality and purity. And a parent must sympathize and participate in his child's work, play or other interests if he is to have the child's love and confidence, which alone can enable the parent to teach and train the child aright.

Puberty is the time when the change from childhood to youth occurs. Youth passes into adult manhood and womanhood gradually, but at puberty momentous changes occur in the physical, mental and moral natures of the child. Especially are the organs of reproduction affected. Puberty begins in girls usually between the twelfth and fifteenth years, and in boys a year or so later. This is a time

when right books, companions and all associations are of vast import to the young person, and when there is the greatest need of the loving care of a wise and thoughtful parent, who will always know where his or her child is and what influences surround the child. But the child must be trusted, for then only can trustworthiness be developed; the child must be respected if self-respect is to be possible.

The phenomena of reproduction should be studied by the child as they occur in plants and the lower animals, thus bringing the boy or girl to a natural knowledge of the significance of the facts and physiology and hygiene of sexuality in the human being. This is largely a matter for our school curriculum, but the parent must not shift responsibility to the school altogether.

Syphilis is so terrible a disease—as likewise are the other venereal diseases—that avoidance of it is of the utmost importance. Two ways of protecting people against it are advocated by medical men, viz., 1, personal purity, and 2, the regulation and state control of prostitution—so-called licensing of the social evil. Of these two measures the first mentioned is possible to everyone. The necessary and certain way of securing personal purity is by **hard work of mind and hard work of body**. “Idleness is the mother of lechery.” No young man who is absorbed in his work (or who has a “hobby” for his spare time) will find it difficult to control passions which are natural, but which may be properly and safely gratified only within marriage. Parents should see to it, as one of their first and highest duties, that their children have proper, agreeable, absorbing, pure-minded occupations and pastimes. Good literature, good companions, good moral training, habits of industry, high ideals of success, simple food—these things ensure a sound body and a healthy, pure mind, without which true happiness is impossible. Parents must always think of the future of their children and they will then realize how tremendously important health (or wholeness) of body and mind are. Contrast the lifelong misery and mental torture of the wretched, diseased and despised victim of immorality, as compared with the happy, joyful and useful respected man or woman whose parents wisely and patiently guided and trained them.

Eighty per cent of all deaths from pelvic diseases in women are due to gonorrhea. Twenty per cent of all blindness is due to gonorrheal infection of the newborn. Fifty per cent of all marriages that are involuntarily childless are caused by gonorrhea of the female organs of generation, of which forty-five per cent are due to marital (i. e., in married life—wife infected by husband) infection by men.

In this country it is impossible to quote statistics, as they never have been gathered. The committee of fifteen estimated that there were annually 200,000 in New York City alone. In Prussia, where they have more reliable data, it has been estimated that typhoid fever represents a yearly loss of 8,000,000 marks (a mark is about 25 cents in value), while the increased expenses and decreased income caused by venereal diseases amount to 90,000,000 marks annually—an amount which exceeds that caused by tuberculosis. But the financial loss is of minor importance compared with the enormous social changes and consequent social misery.

In Germany there is a society for combating venereal diseases. It is a national organization for sanitary prophylaxis, with local branches in more than twenty-two of the larger cities of Germany. The annual membership fee is about 75 cents, and all classes of society are represented in it. The managing board of the society consists of 49 persons, principally physicians, with lawyers, the mayors of Mannheim and Frankfurt, and some insurance and high government officials.

A special committee of this society has prepared two circulars, one for men and the other for women and girls, each written in simple style. The circular addressed to men has been distributed by the hundreds of thousands throughout the universities, the workshops and other industrial establishments wherever German is spoken. The society has recently issued a warning circular for women and girls which is now being distributed broadcast throughout the factories, etc. The circulars do not touch the moral side of the subject. The society replies to criticisms on this point that it leaves this to other hands.

Literal translations of both circulars follow:

'Instructions for Men.

1. Abstinence in sexual intercourse, according to the unanimous verdict of physicians, is not injurious to health, notwithstanding a widespread notion to the contrary.

A temperate life and physical exercise in the open air (walking, gymnastics, swimming, rowing, skating, etc.) can prevent the sexual desire from getting the upper hand. Be pleasantly and fully occupied all your time and it will be an easy and simple matter to be pure and virtuous.

2. The so-called venereal or sexual diseases are very prevalent among all classes of the population. The most important are gonorrhea and syphilis.

Gonorrhea begins (a few days after the contagion) with a discharge from the man's or woman's private parts, often with pain, smarting or itching. It may not attract attention at all, especially in a woman. It leads in many cases to various and sometimes very serious after-troubles. It may be still present and contagious long after the patient believes himself or herself to be entirely cured. They may then unknowingly give the disease to others. Very frequently in this way women become infected after marriage—many serious female diseases, and the childlessness of many married couples, are the results of gonorrhea. The poison of the disease is liable to get into the eyes of the babe during birth, and if not properly treated, to make it blind.

Syphilis begins with a little break in the skin, a small lump or a sore, generally not until several weeks after the contagion, and leads in its further course to eruptions on the skin, sore throat, etc. After these have all passed away, in the course of the next three or four years, sometimes even considerably later, the most various manifestations of the disease are liable to appear in any or every organ. Under appropriate treatment, as a rule, their course is mild and benign, but in many cases, especially when the treatment of the disease is neglected, extremely serious affections may result, with a train of distressing consequences. The disease is contagious for years, and may be transmitted to the offspring, even when the person affected seems to be apparently free from it.

3. The main source—direct or indirect—of the venereal diseases is intercourse with prostitutes, that is, with women and girls who give themselves up to several men for money. These girls usually take gonorrhea or syphilis or both very early, and then give them to others. Even medical inspection of prostitutes is not a certain protection—the young prostitutes in particular are especially dangerous. But also women who do not make themselves prostitutes, if they have the slightest habit of irregular sexual intercourse, are exposed to the danger of contagion, and are therefore liable to give the disease to others. They may even be affected without any suspicion of it, and without any one's being able to detect any signs of disease on them.

4. Every sexual intercourse outside of married life carries danger. This danger may be materially reduced by cleanliness, disinfecting washings, and by the use of special protecting measures, but these never entirely remove the danger.

5. A very large number of venereal contagions occur under the influence of liquor; many are made worse by liquor drinking. In this way also liquor drinking causes much harm.

6. Syphilis can be taken also without sexual intercourse; contagion can occur from kissing. Also articles such as eating and drinking utensils, pipes and shaving brushes, used by strangers, should be avoided, as they are liable to transmit the disease. A wet-nurse should never be engaged without a medical examination, and a child that has not been examined by a physician should never be given the breast by anyone else than its mother.

7. Every wound or sore, inflammation or discharge on the private parts may be extremely contagious. Whoever has anything of the kind should, of course, refrain from sexual intercourse and apply to a registered physician (never to a quack) for a medical examination. By prompt recognition and appropriate medical treatment severe sufferings later may frequently be warded off. Nearly every case is completely curable, although not for years in some instances.

8. A man with gonorrhea or syphilis can not himself tell whether he is really cured or not. He must have himself examined by a physician again and again in the course of months, often years, so that the physician can follow the course of the disease and resume treatment again as it is needed.

No one should allow himself to be influenced by the advertisements of quacks and irregulars against the use of mercury in the treatment of syphilis. This treatment, according to the universal verdict of doctors, is necessary, extraordinarily effective, and harmless in the hands of a well-instructed physician. He who does not apply to a physician or who breaks off treatment or does not return for examination later has only himself to blame when he is again overtaken with manifestations of the disease, although sometimes not until many years later. By such neglect he not only injures himself, but frequently also other persons. Apoplexy, locomotor ataxia or insanity may result if the treatment is not thorough.

Before or after the apparent subsidence of a venereal disease, before a man has been declared by a physician to have got over the contagious stage, if he gives the disease to another person or exposes the latter to the danger of contagion he is liable to be sued in the civil and criminal courts and held for severe damages. The criminality is just as serious when the other party is a prostitute.

Any one who has had gonorrhea or syphilis must beware especially of marrying, or, if he is already married, of resuming sexual relations until express permission has been obtained from his doctor. Above all, persons with a venereal disease must take especial care of the cleanliness of their bodies. The syphilitic especially must always bear in mind that, even without sexual contact, he is liable to give the

disease to others by carelessness and infect innocent women and children.

9. Any one who has ever had a venereal disease must inform the physicians, to whom he applies later, of this fact. It may prove essentially important for the recognition and treatment of troubles later.

Instructions for Women and Girls.

This circular is addressed particularly to girls who become wage-earners early and have no suitable persons to give them advice.

Among the most serious dangers which threaten these girls is the danger of sexual relations outside of marriage, to which they are often led by apparently harmless pleasures, such as dancing.

Intercourse with young men, in whose heedless and often absolutely dishonest promises the inexperienced girls put altogether too much trust, being led astray by advice of wanton female friends, and indulgence in intoxicating drinks—these are the allurements to which thousands of girls fall victims.

For girls sexual relations before marriage have a twofold danger—the danger of getting in the family way, and the danger of sexual diseases.

The girl who is in a family way is hindered in her work. She frequently loses her position. She falls into disgrace and poverty. The poverty grows worse when a child comes into the world. The girl then frequently falls lower and lower until she becomes a common street-walker and thief.

Although the father is bound by law to support his child born out of marriage until it is 16, yet he often manages to sneak out of this duty or is too poor to attend to it.

Besides all her other burdens, the expense of supporting the child then falls on the young mother, whose weakened health generally makes her unable to work much.

Men who seek sexual relations outside of wedlock generally have intercourse with several women, especially also with prostitutes. The consequence of this is that **nearly all of these men suffer or have suffered from some sexual disease.** Any one who has a sexual disease can give it to others, even when he is apparently entirely healthy, and in many cases even when he considers himself entirely cured.

On account of the widespread prevalence of sexual disease among men, every girl who has sexual intercourse even once with a man exposes herself to the danger of contagion.

The two principal sexual diseases are **syphilis** and **gonorrhea**. The latter does far greater harm to the body of the woman than to that of the man. Gonorrhea spreads upward in the female into the interior of the body and causes in some of the lower internal organs severe inflammation and suppuration. Gonorrhea frequently makes the woman a chronic invalid, permanently unable to work. The poison of the disease is liable also to get into the eyes of the baby during birth and to make it blind.

Syphilis is a disease that lasts for years, which poisons the whole body and not seldom leads to the severest disfigurements and after-troubles. Stillborn children are a frequent consequence of syphilis.

Even when the person affected has no longer any manifestations of the disease it is liable to be transmitted to the offspring and induce in them serious forms of the disease.

Hence the following advice should be taken to heart:

1. Always be on your guard, so that a single hour under the influence of liquor may not rob you of your honor, your health, your money-making capacity and your life's happiness.

Close your ears to the persuasions of go-between women. These women profit by your ruin.

Be moderate in your indulgence in beer and other intoxicating liquors, or **better still, avoid them altogether**, especially when in company with men, and above all, at a dance.

2. If you have once yielded yourself to a man you must for long afterward be on the lookout for the injurious consequences that are liable to follow.

Examine your body for a long time afterward with the greatest care.

If signs of being in a family way develop, then go and state your case to some benevolent minded woman. In all the larger cities there are societies which come to the aid of a girl in this condition, and mediate between her and her parents, and also with her seducer.

Smarting and itching in the private parts, especially a discharge not noticed before, suggest that gonorrhea has been taken. Any sore or lump or ulceration on the private parts, any eruption or sore throat, suggests infection with syphilis.

On finding these signs, which often do not appear until after three or four weeks, go **at once to some doctor** (and **always to a registered physician**), a man or a woman doctor (never to a nature healer or a quack). If these diseases are treated correctly from the first their course is generally mild. Then, and then only, as a rule, can a complete cure be effected.

It is not enough, of course, merely to go and see the doctor. His directions, especially his instructions in regard to the most careful cleanliness, must be strictly followed in all points.

3. If you have taken a sexual disease then you must heed the following advice:

Until the doctor declares that you are entirely cured, all further sexual relations are strictly forbidden. If you act contrary to this rule you lose all claim to sympathy, your behavior is criminal, and you are liable to severe penalties.

You must not get married until the physician has given his consent. Otherwise your husband may take the disease from you, and your children may be diseased.

At every later sickness, at every pregnancy, at every sickness of your child, you must tell the attending physician of your former sexual disease, in your own or your child's interests. The physician is bound by law to the most absolute secrecy; you can confide in him without reserve. Your telling of your former sexual disease will in many cases show him the way to treat the new trouble and the pregnancy.

4. If you have had sexual intercourse and yet have not got in a family way nor taken a sexual disease do not let yourself be lulled into security. The warnings here given are still most emphatic.

5. Infection with syphilis may occur without sexual relations. For instance, a healthy wet-nurse may take the disease from a syphilitic child, or a healthy child from a syphilitic wet-nurse. Consequently before taking such a position both wet-nurse and child should be examined by a physician.

Syphilis may also be transmitted by a kiss and by the common use of eating and drinking utensils; gonorrhea by handkerchiefs, bandages, bed-linen, sponges, syringes and the like.

Consequently, be on your guard here also. Practice always the most painstaking cleanliness.

Heed well the advice imparted in these instructions. **Your happiness and your health lie in your own hand.**

"I doubt whether the impelling influence to initial debauch in young men is the result of animal passion. It is more often curiosity or a desire to prove his virile endowment, often the erroneous idea that sexual indulgence is essential to health.

"It is the experience of all medical men that ignorance is responsible for a large proportion of infections in the young, and that enlightenment which would engender a wholesome fear of these diseases would preserve thousands of them from exposure.

"This education would not only serve as a preservative against exposure to infection, but it would constitute the most valuable prophylactic measure against its introduction into marriage. The vast majority of men who carry disease and death into their families from uncured venereal diseases do so ignorantly. A general diffusion of knowledge regarding the nature and danger of these diseases, the duration of their contagious activity, and the terrible consequences to their wives and children would be largely instrumental in preventing these social crimes."—Morrow.

"Morality, religion and education are the three great pillars of the state and the substance of all private good. A community from which they are banished represents more than the gloom of the original chaos. Therefore, they should be objects of primary regard by the law."

"There would be no question as to a social evil and venereal diseases were it not for prostitution. Year by year thousands of young men and women (Morrow estimates 450,000 boys in the United States alone) who began life with the expectation of pure living and high ideals, take the fatal plunge into the moral sewer, losing what they can never regain, even by the most careful living or conduct consistent with the standards of the world. The woman, once stigmatized in this way, hides in shame, a voluntary exile in certain haunts of seclusion; she struggles on leading a life of shame for a few short years (the average length of life of a prostitute is about six years), and then sinks, often a hopeless syphilitic and perhaps a drunkard, ending her days by suicide or with tuberculosis or in general decrepitude in an almshouse. The man, on the contrary, by reason of the double standard of morals adopted by a cowardly society, conceals his pollution, puts on a brazen face, goes freely into society, and often ends by marrying some pure girl, only to deposit in her lap—as a wedding gift from his first wife, the prostitute—the seeds of the foul disease which makes her innocent wifehood a source of pain and misery, and often renders motherhood impossible or makes their child, if, indeed, one ever sees the light, a wizened monster, more fit for the grave than for sweet, happy, human relationships."—Kelly.

PART THREE—*Obstetrics*

CHILD-BIRTH

THE EXPECTANT MOTHER.

Care of the Mother and the New Born Babe.

Supplies for Child-Birth, Complications of Pregnancy,
How to Avoid Them. Signs. Progress and
Dangers of Pregnancy and Probable
Time of Labor.

Subject Reference

*For Childhood
and Babyhood and
Diseases of Infants
and Children, see
Vol. 1, pages 521
to 647.*

*Diseases of
Women, see Vol. 2,
pages 307-315.*

*Instructions Regarding Confinement. The Lying-in
Period, Care of the Infant, Etc.*

INSTRUCTION THIRTY—*Pregnancy*

Man, like every other animal, begins life as a single cell. This cell is called the **ovum**, which is the Latin word for "egg." It is the product of the ovary, or female reproductive gland, of which there are two, situated in the pelvis. The ovum, or egg, is shed from the ovary into the peritoneal cavity or space lined by the peritoneum. It then passes through the **Fallopian tube** to the **uterus**, or **womb**. It may be impregnated (i. e., unite with a male reproductive cell) on its way from the ovary to the uterus. This is termed **conception**. The ovum is said to be **fertilized** by the male cell. If the ovum is fertilized it lodges in the uterus and grows there. If it does not meet a male cell and become impregnated, the ovum passes out in the monthly flow.

A developing ovum is termed an **embryo** until it is four months old. It is then called a **fetus** (or **foetus**) until nine months old, when it passes out of the uterus in the process known as **parturition**, or **child-birth**, and becomes a **new-born infant**.

The condition of the woman from conception to child-birth is termed **pregnancy**—she is said to be **pregnant**, *en ciente*, "in the family way," or "in an interesting condition."

The popular notion that child-bearing is beneficial to women with a consumptive tendency is entirely a mistake. The great tax on a woman's strength and health during pregnancy and nursing often brings on tuberculosis.

The **signs** and **symptoms** of pregnancy are:

I. **Cessation of the menses**, or monthly periods, which do not usually begin again until the mother stops nursing.

2. **Morning sickness.** This usually occurs only in the first three or four months of pregnancy, and may amount only to slight nausea on rising in the morning without actual vomiting. Sometimes there is severe vomiting, which is very hard to control and which may be a serious thing, exhausting the woman's strength.

3. The **breasts enlarge** and the **areolæ** (or dark areas about the nipples) become darker. The veins over the breasts become larger and may cause a throbbing sensation.

4. The **abdomen** becomes enlarged, because the uterus grows larger as the embryo develops.

5. Between the sixteenth and the twentieth week **quickening** is felt—that is, the mother first feels the movements of the child.

6. From the fifth month on the fetal **heart-sounds** may be heard by applying the ear to the abdomen. A stethoscope aids greatly and the sounds are heard best at some particular point, according to the position of the child. The sounds resemble the ticking of a watch under a pillow, and they number 130 to 160 a minute. **The occurrence of these sounds is the only positive sign of pregnancy.**

7. The blood may be heard rushing through the arteries in the mother's abdomen, causing a peculiar whishing sound.

8. Other signs are made out by the physician by vaginal examination. The chief of these is the change in the cervix, or lower end of the uterus. If it is **as hard as the tip of one's nose** pregnancy is not present; if it is **as soft as one's lip** pregnancy is almost surely present. This applies best in women who have never been pregnant.

9. The coloring matter, or pigment, of the body is everywhere increased in amount. Thus not only are the areolæ on the breasts darkened but a dark line appears extending downward from the navel.

10. The nervous system is much affected. Ill-tempered women **may** become amiable, and sweet-tempered ones become cross and irritable. The appetite is capricious and "longings" for some particular food are common. The saliva is increased in amount. The face also changes in expression, having a drawn appearance about the mouth and eyes.

Ordinarily the diagnosis of pregnancy is easy and the patient is usually aware of her true condition before she consults a physician.

In a small minority of cases the task is by no means so easy, and in a number of cases we are unable to decide with absolute certainty. Mistakes are most frequently made in the first few months, but even at full term it may be mistaken for some other tumor.

TABLE FOR CALCULATING THE DURATION OF PREGNANCY, AND THE PROBABLE TIME OF LABOR.

The two dates given together are the date of the last menstruation and the corresponding probable date of the confinement:

Jan.	Oct.	Feb.	Nov.	Mar.	Dec.	Apr.	Jan.	May	Feb.	June	Mar.
1	8			1	6			1	5	1	8
2	9	1	8	2	7	1	6	2	6	2	9
3	10	2	9	3	8	2	7	3	7	3	10
4	11	3	10	4	9	3	8	4	8	4	11
5	12	4	11	5	10	4	9	5	9	5	12
6	13	5	12	6	11	5	10	6	10	6	13
7	14	6	13	7	12	6	11	7	11	7	14
8	15	7	14	8	13	7	12	8	12	8	15
9	16	8	15	9	14	8	13	9	13	9	16
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27	3	26	3	27	1	26	31	27	3	27	3
28	4	27	4	28	2	27	1	28	4	28	4
29	5	28	5	29	3	28	2	29	5	29	5
30	6			30	4	29	3	30	6	30	6
31	7			31	5	30	4	31	7		
						31	5				
Nov.					Jan.		Feb.		Mar.		Apr.

July	Apr.	Aug.	May	Sept.	June	Oct.	July	Nov.	Aug.	Dec.	Sept.
1	8	1	8	1	8	1	8	1	8	1	8
2	9	2	9	2	9	2	9	2	9	2	9
3	10	3	10	3	10	3	10	3	10	3	10
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23	30	23	30	23	30	23	30	23	30	23	30
24	31	24	31	24	1	24	31	24	31	24	30
25	1	25	1	25	2	25	1	25	1	25	1
26	2	26	2	26	3	26	2	26	2	26	2
27	3	27	3	27	4	27	3	27	3	27	3
28	4	28	4	28	5	28	4	28	4	28	4
29	5	29	5	29	6	29	5	29	5	29	5
30	6	30	6	30	7	30	6	30	6	30	6
31	7	31	7			31	7			31	7
May		June		July		Aug.		Sept.		Oct.	

THE PERIODS OF GESTATION.

The periods of gestation are 11 months each in the horse and ass; camel, 12 months; elephant, 2 years; lion, 5 months; buffalo, 12 months; cow, 9 months; sheep, 5 months; reindeer, 8 months; monkey, 7 months; bear, 6 months; sow, 4 months; dog, 9 weeks; cat, 8 weeks; rabbit, 4 weeks; guinea pig, 4 weeks; wolf, 90 to 95 days; goose sets 30 days; swans, 42 days; hens, 21 days; ducks, 28 days; pea hens and turkeys, 28 days; canaries, 14 days; pigeons, 14 days; parrots, 40 days. These periods vary a good deal, however, especially in domestic animals. Various conditions modify the period, and the above are only averages.

The signs and symptoms may be divided into three groups—positive, probable and presumptive.

The **positive signs** cannot usually be detected until after the fourth month and are three in number, viz., the foetal heart-sound, movements of the foetus, and being able to map out its shape.

The probable signs noticed much earlier can only be made out by a special examination by the physician.

The presumptive signs, those noticed earliest, are: Cessation of the menses; changes in the breasts; morning sickness; quickening or feeling life; disturbance in urination; abnormal cravings; abnormalities in the pigmentation, and mental disturbances. In regard to presumptive signs, none are reliable in themselves, as they may be produced by other causes; hence are only useful when a number of them are noted together.

The **duration of pregnancy** is nine calendar, or ten lunar, months, or 280 days, about. It may vary several days, either earlier or later. The **probable time of confinement** (or giving birth) is calculated from the date of appearance of the last monthly. Count back **three months** (or forward **nine months**) and add **seven days** and you have the **probable time** for the birth to occur. Conception usually occurs **soon after** the cessation of the flow, which generally lasts seven days. Conception may occur, however, **just before** the monthly and not arrest the flow at all, or only partly, in which case the birth will occur **two weeks earlier** than calculated; or conception may take place **just before the following period** (which, however, does not then occur) and the birth will then be **two weeks later** than the time reckoned.

As it not uncommonly happens that a woman menstruates once or even two or three times after conception, it is not safe to rely too fully on the above rule. The time of quickening should therefore be carefully noted and may be taken as **about the middle of the pregnancy**.

Management of Pregnancy.—Ordinarily the services of the doctor should be engaged some months before the expected confinement, so that he may advise the patient as to her mode of life during the period of her pregnancy. Very little change should be made in her mode of living. She should be encouraged to go on much as usual; see that she has the proper amount of amusement, etc. She should consult her physician whenever anything occurs to worry her rather than take the advice from her woman friends. A woman in her first pregnancy usually needs a certain amount of re-assurance with regard to the dangers of parturition, and the very knowledge that she is in the

hands of a competent and careful doctor contributes very largely to her peace of mind and her physical well being.

Exercise.—The woman should take as much outdoor exercise as possible, especially during daylight, rather than in the evenings, but being careful not to over-tire herself. Walking or driving is the best, ordinary sports being omitted, although seabathing in some instances is very beneficial. Massage should be permitted only by a skillful person, and then only when outdoor exercise cannot be taken.

Diet.—The pregnant woman should have good nourishing food and plenty of it, but avoiding highly seasoned or indigestible dishes. Where she has had a difficult labor from an excessively large child in a previous confinement, her diet should be very much restricted during the last few weeks, especially should she take little liquid, such as water, tea, milk, etc., unless these are ordered. This is said to lessen the weight and size of the child.

Vomiting of Pregnancy.—The majority of women suffer from nausea and vomiting more or less during their pregnant condition. It is frequently the symptom that the woman notes as an indication of her condition. It usually begins about the sixth week of pregnancy and lasts about six weeks, and then gradually disappears, possibly giving no further trouble, except in a few cases, to return during the ninth month. In some cases, however, trouble with the stomach begins immediately impregnation takes place, and continues throughout the whole nine months, and is so aggravated that for weeks the woman may not be able to leave her bed or even raise her head from the pillow. Occasionally a patient has such persistent nausea and vomiting that nothing is retained in the stomach and she has to be fed by the rectum. In such cases they suffer much from thirst and by giving them an enema of salt water as warm as can be borne great relief is given. The salt water should be made by adding one teaspoonful of common table salt to the quart of hot water, and should always be used a half hour or so before a nourishing enema is given. For the latter use Liquid Peptonoids, one tablespoonful to a pint of water. Beef juice or beef tea may also be used. The following is exceedingly nourishing and readily made: The whites of two eggs in a half pint of water that has been boiled, half an ounce of brandy, a pinch of salt; shake to mix, and then put it into the rectum with a syringe. In some cases giving hot water by the mouth in teaspoonful doses every few minutes is beneficial. Sometimes the patient can drink and retain a whole glass of water, when a smaller amount is at once vomited. The application of a mustard plaster over the stomach

greatly aids the other remedies. Along with any of these, or other medical treatments, insist upon rest in bed.

The Bowels.—In the early months the bowels may be constipated and require attention, and frequently during the last few months their normal movements may be interfered with by direct pressure from the enlarging womb. In regard to constipation in either the early or later months, the patient should be very careful about taking strong purgative medicines and should rely upon some mild laxative, such as Cascara Sagrada, Pill aloin strychnia and belladonna, or some similar medicine. Many times it is good treatment to take a normal salt enema (one teaspoonful of salt to the quart of water) once or twice a week, rather than allow the bowels to become loaded up. In some instances the judicious administration of an occasional small dose of calomel is followed by very beneficial results.

Clothing.—Generally speaking, the clothing should be worn loosely and in the later months the corset should either be entirely dispensed with or replaced by a loosely-fitting corset-waist. Where the abdomen is very lax and pendulous, as found in women who have borne a number of children, it is well to wear an abdominal support made of strong muslin or elastic material.

In cases suffering from enlarged or varicose veins of the extremities the legs should be either bandaged with a bandage made of soft baby-flannel or encased in elastic stockings. Where these enlarged veins are around the vulva the patient should be exceedingly careful against the possibility of a rupture, which is apt to produce a severe hemorrhage.

Sexual Intercourse.—In healthy persons sexual intercourse in moderation does no harm during pregnancy. Where there is a tendency to abortion it should be strictly prohibited. It should be positively forbidden always in the last month of pregnancy.

The Breasts.—In the last three months of pregnancy some attention should be given to the breasts, and especially to the nipples. Small nipples should be manipulated once or twice a day, so as to develop them, and bathed with alcohol and witch-hazel in equal parts, so as to toughen the skin and thus prevent the soreness which usually results from nursing in the first week or ten days after confinement. By this attention the occurrence of fissures and abrasions is largely prevented, and the danger of infecting the breast, resulting in an abscess, or "gathered breast," is avoided. Other lotions may be used, such as one of saturated solution of boracic acid, or simply whisky and water—in fact, anything of a slightly astringent character may

be used, there being as much in the manipulating of the nipple from day to day as in anything applied.

Urine.—It is strongly advisable to have the urine examined by your physician from time to time during pregnancy, owing to the frequency of kidney disturbances and the serious consequences which frequently result and might be anticipated were such examinations made from month to month, or week to week, as found necessary. Where a pregnant woman notices a scanty flow of urine, persistent headache, any disturbance of vision, swelling of the feet and face, any loss of blood no matter how slight, and persistent constipation, she should immediately consult her attendant physician, so that he may advise her regarding the conditions and, when necessary, prescribe appropriate treatment.

Special Dangers.—Miscarriages rank first among the special dangers of pregnancy. It is difficult to estimate how frequent they take place. A conservative estimate, however, would indicate that about every fifth or sixth pregnancy ends in miscarriage. There are many causes productive of this termination of pregnancy. Anything which interferes with the development of the embryo, and is inconsistent with foetal life such as to interfere with its nutrition, may produce the expulsion of the contents of the womb. All exciting causes, such as a slight fall, jar, overexertion, a ride over a rough road, etc., may result in producing a miscarriage. On the other hand, the most violent exercise and the rudest manipulations are often borne with impunity, so that each woman is practically a law unto herself. Practically the only paternal cause of a miscarriage is syphilis; this frequently leads to changes in the afterbirth, or placenta, and the organs of the foetus, which bring about its death and premature expulsion.

The onset of a miscarriage is usually preceded by certain symptoms, the most important being pain in the back and lower abdomen and hemorrhage. Loss of blood, no matter how small a quantity, in the early months of pregnancy should always be regarded with suspicion. When miscarriage becomes imminent the hemorrhage is usually quite profuse, but, as a rule, not sufficient to endanger the life of the woman. She has also severe cramp-like pains in the abdomen, which later become bearing-down in character. These conditions go on until the mouth of the womb becomes sufficiently dilated and the contents are expelled, after which the hemorrhage and pain cease and the parts in time resume their normal condition in the course of a week or longer.

Whenever a woman is threatened with a miscarriage she should

be placed at once in bed and kept in a recumbent position until all danger is over. If there is much bleeding, the foot of the bed should be raised and the physician promptly sent for.* After a miscarriage the woman should stay in bed at least five days, and late in pregnancy the treatment should be the same as when a full-time birth occurs, including the stay in bed for ten to fourteen days.

Eclampsia, or Convulsions During Pregnancy.—In a pregnant woman convulsions is another of the special dangers. This condition varies in frequency in different localities and in different years. It is, as a rule, not met with before the second half of the pregnancy, and is more frequent nearer the end of the term. Women who are pregnant for the first time are more liable to the disorder than those who have borne children. Twin pregnancy appears to act as to be an active cause. An eclamptic convulsion may occur without the slightest warning in a woman apparently in perfect health. Usually, however, they are preceded by certain symptoms indicative of the system's becoming poisoned. Thus we may find a pregnant woman suffering from headache or neuralgia, pain in the stomach, disturbance in the vision, swelling of the feet and lower extremities, etc., and a marked **decrease** in the quantity of urine. The attack may come on while the woman is asleep, but if awake the first symptom noticed is a fixed expression of the eyes, which soon begin to roll from side to side. The mouth begins to twitch and the entire face becomes distorted. This twitching rapidly extends to the arms, the body and finally the legs. The breathing is loud, the face flushed, the patient foams at the mouth, and frequently bites her tongue. The convulsion usually lasts from a few seconds to two minutes, rarely longer, but may pass rapidly from one into another, so that it seems to be one continuous convulsion. After the movements cease she passes into a deep sleep, which lasts for a longer or shorter period. Sometimes a patient may have but one convulsion; usually, however, they have several, even as many as one hundred or more in fatal cases. Occasionally a patient may have but one convulsion, never recovers consciousness and dies in spite of the best of treatment. The greatest number of cases affected with convulsions take place after labor begins or during the confinement; the fewest after delivery has taken place. The convulsion is always followed by a period of unconsciousness, and usually there is no recollection of the attack coming on or even of events that took place for several hours before the onset. When the woman is first seen it may be mistaken for an epileptic fit or one of hysteria; hence the necessity of promptly summoning a physician.

Convulsions in the pregnant woman are always looked upon as most dangerous, 20 to 25 per cent dying even when attended in a most skillful way. In regard to treatment, "prevention is better than cure"; hence the necessity of having the urine examined from time to time. It usually indicates the possibility of such trouble developing when on testing it shows a certain amount of albumen, indicative of the system absorbing certain poisons that should be carried off through the kidneys. All such cases are exceedingly susceptible to infection; therefore all surroundings should be made as aseptic or as clean as possible.

Pruritis.—Itching is often a distressing complication of pregnancy. It may extend over the whole body or may be confined to the genitalia, or "private parts." It is sometimes so annoying that the patient is unable to sleep, and so, by the loss of rest and the nervous strain, the whole general system is upset. The best treatment for such cases is to give some medicine to soothe the nervous system and a tonic to build them up. Where the itching is confined to the "private parts" it may be due to some irritating discharges, to parasites, or to sugar in the urine. When due to discharges from the vagina give a normal salt water douche, not too hot, and with not too great force, and repeat often enough to keep the parts thoroughly clean. Ointments containing cocaine, menthol or carbolic acid may be applied with satisfactory results. If due to sugar in the urine, eliminate all sugars and starchy foods from the diet. Sometimes itching round the anus is due to pin-worms, and may be destroyed by an infusion of Quassia, or 5 grs. of Santonin.

The Influence of Mental Emotions Upon the Fœtus.—Many cases of mental peculiarities, or diseases, or of physical defects, that have been attributed to a strong impression upon the mother during pregnancy are no doubt to be explained by the existence of some systemic disease, as syphilis, nephritis, diabetes, cancer or chronic lead-poisoning in either father or mother; by an arrest of development; by mechanical disturbances of the ovum, or in case of intra-uterine amputations by the formation of bands, or the disposition of the cord; but there are still many well authenticated cases of defects or peculiarities which bear startling resemblances to the cause of the impression upon the mother during pregnancy. A strong emotion on the part of the mother may be immediately fatal to the fœtus. The idiocy of Barnaby Rudge, due to maternal shock and fright, is a fiction founded upon fact.

Certain maternal conditions so affect the blood that in a number

of cases it seriously interferes with the health of the fœtus, and it may even destroy its existence. Whatever the cause of death may be, it is a fact that pneumonia is exceedingly fatal to the fœtus. Jaundice is another condition that has a very detrimental effect on the fœtus. Where a woman is so affected it usually results in a miscarriage, and nineteen out of twenty children are either born dead or die soon after birth when the mother is jaundiced. It is also noted that where a mother is nervous and worries a great deal the infant will suffer from colic and be very trying to take care of. Hence the necessity of every prospective and nursing mother maintaining as cheerful and happy a disposition as possible if they want "a good baby." The children of phlegmatic women are, as a rule, little trouble in the early months of their lives.

INSTRUCTION THIRTY-ONE—Confinement

The Period of Confinement

Labor—Lacerations and Repairs.

Labor.—It is well to make certain preliminary preparations for the confinement, and in order that all mistakes may be avoided it is a great convenience to have made a note of everything required. Usually the doctor furnishes the patient with a list of what is needed. The room to be occupied should be selected for its light, heat, size and general convenience. The following list will be found exceedingly useful: At least two wash basins: they may be plain agate ware; a bed pan; a two-quart fountain syringe (never use a borrowed one except in an emergency, and then only after it has been thoroughly sterilized); fifteen yards of sterile gauze, which is usually procurable at a drug store, but ordinary cheese cloth properly sterilized will answer; two pounds of cotton batting for making bed pads, and a rubber or good oilcloth sheet.

The following articles should be obtained from the druggist at least one month before the expected time of confinement, so that they may be in readiness in case labor should occur unexpectedly:

Green soap	1 ounce
Vaseline	1 ounce
Boracic acid	4 ounces
Bichloride tablets	1 bottle (100)
Alcohol	8 ounces

Nail-brush	1
Absorbent cotton	1 pound
Talcum powder	2 ounces

A sufficient number of bed and vulval pads should be prepared so as to be ready in an emergency or when the time arrives. They should be done up in several packages. There should also be several towels or diapers, one-half pound of absorbent cotton, one or two sheets, all in packages and sterilized by steaming for two hours.

Just as soon as the nature of the pains show that labor has actually commenced, the patient should take or be given a full bath and a rectal enema; also put on a fresh, clean nightgown. The regular labor pains usually begin in the back, but may begin in the abdomen. At first they may simulate an ordinary colicky pain, subsiding for an interval and returning, the severity of the pain increasing while the interval between them decreases. False pains may be mistaken for the regular pains, but are usually due to some disorder in digestion and promptly disappear when the alimentary canal is cleared out by the enema.

During the first stage of labor, or until "the waters break," the patient should be allowed to assume any position she may find the most comfortable; in fact, should be rather encouraged to remain up as long as possible. When the second stage begins, indicated by the rupture of membranes and discharge of the waters, the patient should be put in bed, as it is more convenient for those in attendance to aid her in this position. The third stage begins with the expulsion of the foetus and terminates when the placenta or afterbirth comes away. When an anæsthetic is given it should be given during the second stage and only enough to render the patient partially unconscious, but increasing it the nearer the time the head is born, even to the rendering of complete unconsciousness during the last few pains. As soon as the child is born the anæsthetic should be withdrawn, unless in some cases where a laceration has to be repaired. Chloroform is the favorite anæsthetic to be used, although many physicians use ether. There is little danger in giving chloroform while labor is going on. The danger, however, is materially increased if continued after delivery has taken place. Whatever anæsthetic is used, it should be administered by a physician or immediately under his direction. One of the gravest of accidents that may happen is a severe hemorrhage immediately after or, at most, within a few hours of delivery, called by medical men **postpartum hemorrhage**. It is due to the womb fail-

ing to contract promptly, either from the retention of some blood clot, a portion of the placenta or afterbirth, or a loss of the contractile power in the walls of the womb. When such an accident happens, raise the foot of the bed and knead the abdomen to stimulate the contractions, in the meantime having sent for the physician. Should the patient complain of feeling chilly, try to warm her up by means of hot bottles, hot bricks, hot plates and additional covers to the bed. Hot rectal enemata of equal parts of black coffee and salt solution are found to be exceedingly valuable in keeping up the strength of the woman. Occasionally, when there has been great loss of blood, the extremities should be bandaged to keep as large a quantity of blood as possible in the body.

Lacerations and Repairs.—Few births take place at a first confinement without more or less tearing of the parts, and where instruments have to be used the danger is very much increased. When, however, a laceration of the parts has occurred, it is the duty of the attendant to repair it at once, making the affair a comparatively easy matter, while if neglected it may mean a life of misery to the patient, or the necessity of undergoing a serious operation. Even slight tears through the soft parts are better repaired than left alone. When united themselves they are often extremely painful and furnish an easy channel for infection and blood-poisoning, more especially if the nurse is lax in her care of the patient. All the treatment afterwards is to keep the parts clean and covered with sterile dressings. There is no necessity of binding the limbs together.

INSTRUCTION THIRTY-TWO—*Lying-in*

The Lying-in Period

Special Dangers, Puerperal Fever, Milk Leg.

The Lying-In Period.—In the average woman it requires about ten days for the womb to contract down below the pubic bones, and then from four to six weeks for the generative tract to return to its normal condition. It was formerly believed that the influx of milk in the third or fourth day was naturally attended by a slight rise in fever and the so-called “milk fever” was regarded as a normal condition. We no longer believe in this, and whenever the temperature exceeds the normal limit at this time we should fear the beginning of an infection due to some error in the attendance.

A woman in her first confinement rarely suffers from “after-pains”

unless the womb has been subjected to an unusual distension or blood-clots or other foreign bodies have been retained in its cavity and as a consequence active contractions of the muscular wall of the womb occur in the effort to dispel them. In women who have borne children the womb has lost part of its tonicity or state of continuous contraction, and therefore contracts and relaxes at intervals. These contractions give rise to severe pains which, in many cases, are aggravated when the infant is put to the breast. They may last for several days, but ordinarily they become quite bearable after the twenty-four hours immediately following delivery.

During the first part of the lying-in period there occurs normally a vaginal discharge; this is quite red for the first few days, but after the tenth day it assumes a whitish or yellowish-white color and has a peculiar fleshy odor. Foul smelling discharge indicates more or less putrefaction. When the reddish color persists for a longer period it indicates imperfect contraction of the womb or the retention of portions of the afterbirth. These discharges are termed **lochia**.

In normal labors no douches should be given until the fourth or fifth day after delivery. A normal salt solution is all that is required. Should the discharge be offensive it is well to use an antiseptic in the douche, the best being bichloride of mercury, 1 part to 5,000 parts of water. Ordinarily all that is necessary is to keep the parts clean. Immediately after the birth of the placenta, the soiled linen having been removed from beneath the patient, the buttocks and external genitalia are washed off with hot water and soap and bathed with an antiseptic solution of bichloride, 1 to 5,000. A sterile pad made of cotton, wrapped in gauze, is then applied over the genitalia and held in place by means of a T bandage, and changed whenever necessary. Each time the pads are changed and after each movement of the bowels the parts should be washed off with an antiseptic solution. Ordinary sponges should never be used, pledgets¹ of cotton batting being more aseptic; that is to say, **cleaner**. The parts should be washed from above downwards, to avoid contamination from the rectum. The vulval pad not only absorbs the lochia (or discharges) and prevents contamination of the parts from without, but also makes it difficult for the patient to touch herself, a practice very common among the uneducated, and apt to cause infection. In regard to the diet, the patient should be encouraged to take a rather limited amount of food for the first three days, or until the appearance of milk, after which she should be given plenty of plain, nourishing food. If not

¹ These are to be used only once and then thrown away.

nauseated, give a glass of milk or cup of tea soon after labor and follow this up with easily-digested foods for the first few days, gradually altering to her regular daily diet.

The lying-in chamber should be well and regularly aired, not too hot nor too cold, keeping the temperature about 70 degrees. The patient should be kept in bed until the womb contracts down below the pubic bones; this usually takes from nine to twelve days. It is exceedingly dangerous for the patient to get up on her feet until such proper contraction takes place, the greatest danger being the possibility of displacement of the womb, owing to its enlarged condition; or hemorrhage. There is no special rule as to what day a patient should get up, all depending on her condition and strength. A word in regard to urination. Usually within a few hours after delivery the patient may desire to empty the bladder. If she is unable to urinate in a bed-pan, while lying on her back, turn her on the side and allow her to try; failing in this position, have her assume the knee-chest position; that is, support herself on her knees and her chest, and try. Should she be unable to urinate in any of these postures, have her sit up on a vessel and empty the bladder in that way. Frequently when you have raised her up in this position she will expel a large clot or two that may have been an irritating cause of severe after-pains. Expulsion of the clot promptly relieves these annoyances. The sitting up of the patient on a vessel in bed is more to be preferred than using the catheter, which always exposes the patient to more or less danger of infecting the bladder and setting up a cystitis (or inflammation of the bladder).

Special Dangers.

Puerperal Fever.—The patient may be infected by disease germs carried upon her person, especially in the pubic and anal regions, by her personal clothing, by the bed clothing and mattress, by the vulvar pads and the pads upon which the buttocks rest, by the material used to wash the vulva and perineum, and by germs lodged in the vagina or womb mucous membranes before labor or even prior to conception. To insure the greatest degree of cleanliness, the woman falling in labor should be given a full bath, washing the genital region very particularly with soap and hot water, after which she should put on **clean clothes throughout.**

The mattress should not have been used in any case of contagious or infectious disease, nor soiled by the discharges of previous labors, by urine, fæces, or any other infected matter. A rubber sheet that

has been carefully scrubbed should be spread over the mattress and the bed freshly made up with clean clothing. The attending nurse must always wash her hands thoroughly before touching the patient. If puerperal fever should develop the general treatment is stimulating. The diet should be easily digestible, chiefly milk, and as much alcohol as she can consume without flushing the face or affecting her head. Absolute rest and freedom from all disturbances, giving her the best nursing possible are imperative.

Phlegmasia Alba Dolens, or Milk-Leg.—This condition gets its name from the appearance of the leg and from the old idea that most of the inflammatory conditions of the lying-in period were due to the effects of the influx of the milk. There are two kinds of this disease. In one the leg is enormously swollen, the skin tense, glistening, and milk-white in color. In the other class there is a septic inflammation of the tissues of the lower part of the body and thigh. In each case the blood in the large vein in the thigh is clotted.

Symptoms.—From the tenth to the thirteenth day the leg becomes very heavy and stiff, with pain, especially in the calf of the leg, great tenderness along the course of the femoral or principal vein in the thigh, which is also marked by a line of inflammatory redness. There is usually slight fever, also a foul tongue, loss of appetite, nausea, vomiting, with profound physical depression, and often a dusky flush on one or both cheeks. The left leg is more frequently affected than the right, but it may develop first in one and then in the other, or both may be swollen at the same time.

The outlook in these cases is always doubtful. Most to be feared is the detachment of a large portion of the clot, and sudden death by its lodging in the lungs. The **treatment** should be: absolute rest flat on the back. Elevate the limb, wrap it in cotton and support the system. The patient should not be allowed to leave her bed for at least ten days after the subsidence of all symptoms for fear of sudden death from the clot becoming dislodged. Abscesses may develop along the course of the femoral vein back of the knee, or in the calf of the leg.

INSTRUCTION THIRTY-THREE—*The Infant*

The Care of the New-Born Babe

The Cry of the Infant—Care of the Cord—Failure of Supply of Oxygen to the Blood—Bathing and Dressing—Clothing—Feeding.

The Cry of the Infant.—Normally the newly-born infant begins to cry at once after its exit from the vulva. It passes urine almost immediately (not infrequently while in the act of being born), and also discharges a certain amount of meconium, or yellowish contents of the bowel.

Care of the Cord.—Formerly the care of the cord was considered of little importance, and the midwife or neighbor in attendance would wrap it up in a piece of greased rag, after which little or no attention was given to it. This very often resulted in an infection which was conveyed through the blood vessels in the cord and from which a large number of children died. Hence the strictest aseptic precautions should be taken in looking after the cord, keeping it clean and dry. Boracic acid, subnitrate of bismuth, stearate of zinc, or ordinary talcum powder are the most commonly used for this purpose, the cord being wrapped in a piece of sterile gauze or absorbent cotton. The cord usually becomes separated within a week, but often it may be longer and in some cases may take several weeks.

Asphyxia.—Any cause which results in an insufficient supply of oxygen to the blood produces asphyxia of the new-born child. There are many causes of this condition, both before and after birth, such as a premature detachment of the placenta or afterbirth, coiling of the cord round the child's neck, compression or prolapse of the cord, prolonged pressure on the infant's brain by the forceps, and a number of diseases of the mother or of the foetus preventing the entrance of air into the respiratory tract.

The Treatment is to remove the cause, if possible, extracting the mucus from the mouth and throat by holding the child by the feet and cleaning the mouth with a finger, slapping the buttocks and vigorous rubbing of the back, sprinkling it with cold water or immersing it in warm water and applying electricity. Then again, mouth to mouth insufflation; that is, blowing air into the infant's lungs by applying your mouth to its mouth (or nose), having first emptied your own lungs and then taken a fresh supply of air into them, or artificial

respiration, doubling the child up and straightening it out about ten times to the minute. There are some risks always in attempting to resuscitate by means of artificial respiration, such as apoplexies, injury to the spine, effusions into the pleura or lungs, rupture of the air vesicles in insufflation; the trachea and larynx may be injured or the lung may be punctured with a broken collar bone.

Great care must be taken of a child that has been revived with difficulty; more likely than not it will die within forty-eight hours hence. It should have careful watching for the first two or three days. It is good practice to give it five drops of brandy and a drop of digitalis every four or five hours, or oftener if required, also to swathe it in cotton batting and when the vitality is low put hot water bottles round it, or bags of hot salt.

Bathing and Dressing.—As soon as convenient after the birth of the child it should be bathed and dressed, provided, however, it is fully developed and healthy in its appearance. The surface of the body is to be well smeared with olive oil, vaseline, lard, or other lubricant. This prevents injury to the delicate skin in washing. The soap used should be preferably castile. Especial care should be taken not to irritate the eyes. A precautionary method usually adopted is to bathe the eyes immediately after birth with a solution of boracic acid, and if suspicious of any special infection, such as from gonorrhea, it is well to drop two or three drops into each eye of a solution of one per cent of nitrate of silver. By looking after the eyes in this way many cases of ophthalmia neonatorum (or inflammation of the eyes of the new-born) is prevented and a large number saved from blindness and permanent injury to their eyes.

The infant should be bathed daily with water at a temperature of 90 degrees. This bath should be given in the warmest room in the house. For the first week, or usually until the cord becomes detached, the baby should be simply sponged in the lap of the nurse; then, if it be strong and healthy, it may be immersed in a tub bath.

It is well to teach the babe to have the bowels moved at a regular time each day, and the best time is after the bath in the morning. The use of a small glycerine suppository or even one made of soap answers very well. When this routine is followed for a short time the bowels will move of their own accord, especially so soon as you begin putting the child in its chair, which should be commenced by the time it is two months old. Early attention to this matter will give much comfort to the mother, and many children so trained can dispense with the wearing of napkins months and months before

those who have not been so trained. It also aids in keeping the digestive tract in good condition and prevents much of the colic that so frequently results from irregularity in attending to the movement of the bowels.

Clothing.—An infant should be clothed in winter as follows: A binder of flannel or knit wool twice around the abdomen; a knit shirt, diaper, knit shoes, and two skirts, the first flannel (in midsummer linen), and finally the dress. The skirts should be supported from the shoulders on tapes. Each skirt should be made with a body and not a band. A light flannel shawl is desirable to protect the child's head from cold when it is lifted from its crib or carried into another room.

Owing to the infant's urinating frequently, care should be taken to change the wet napkins; dry the buttocks carefully and powder them with talcum powder or rice-flour powder.

Feeding.—No food develops the stomach of the infant so well as the mother's milk, the secretion of which is usually established at the end of forty-eight hours, but may be deferred a longer period in a few cases.

Just so soon after delivery as requisite for the mother to be properly taken care of and rested and the infant washed and dressed may it be placed to the breast, and its nursing education begun. At first it will only get a little "colostrum," usually enough to satisfy its hunger. This colostrum contains many fat globules and has a laxative effect on the child, aiding materially in clearing out the bowels. The infant should be put to the breast regularly every two hours during the day and allowed to sleep as long as possible during the night. All babes take one long sleep of five or six hours during the twenty-four hours and if properly trained it will take this sleep at night, which is the right time, but when feeding and sleep are irregular we find as a result indigestion develops and instead of a good, healthy child, a pleasure in the household, you will have the colicky, crying, irritable infant that gives no peace night or day to the nurse or nervous mother, and renders home-life anything but happy. Where the milk is slow in being established and the infant is restless from hunger, give it a few teaspoonfuls of plain hot water and nothing else. If the passages from the bowels should be green and with much mucus showing, also numerous curds, give it a course of small doses of calomel, say 1-20 to 1-10 of a grain rubbed up with one or two grains of sugar of milk. Give eight or ten of such sized powders a half hour apart, and then follow with a teaspoonful of castor oil.

(See also section on **Babyhood and Childhood.**)

PART FOUR—*Sex-Life—Diseases of Women*

Sex-Life--Marriage--Eugenics

Do You Know How to Instruct Children in the Delicate Matter of Sex?

Misguided Parents and Ignorance of the Young People in
Our Homes Enemies to Sexual Health.

Diseases of Women.

INSTRUCTION THIRTY-FOUR—*Plain Facts*

Child-bearing is a great tax on the whole constitution, involving both the emotional and the mental as well as the physical powers. It carries also, however, certain very substantial and direct benefits as a usual thing. Then it has been proved that maternity wards off old age. Other things being equal, a mother is younger than a woman of the same age (in years) who has never borne a child. But there are many dangers in pregnancy and in child-birth, and these, too, often leave serious injuries which if neglected become the underlying cause of various states of ill-health or even chronic invalidism. It is especially during the six or eight weeks after child-birth that the health is liable to be permanently injured, by too early return to arduous household duties. Injuries during confinement are a fruitful cause of ill-health in married women, but if proper medical and surgical treatment is taken these injuries are generally easily remedied. Another cause of even more serious disease is **sterility**, whether intentional in the married woman or enforced in the single state. Diseases of the ovaries are especially prone to attack women who have never borne children.

Other causes of those serious ills which assail woman are the evil results of irrational fashions of **clothing**; the injurious effects of the strenuous system of modern **education** of girls; the unhealthful **indoor life** of many women, especially home workers; in regard to the evacuation of the bowels and of the bladder; the **long-suffering nature** of woman which leads her to endure in silence the early symptoms of diseases that thus going untreated sooner or later become incurable;



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A MOTHER'S COMPANIONSHIP

Affection bestowed at an early age will gain and hold the confidence necessary to mould the character.

false modesty often prevents the woman from consulting a doctor and receiving proper advice and treatment; **venereal diseases**, particularly gonorrhea, are responsible for many of the most serious cases among invalid women. The foregoing causes are more fully discussed in other parts of this work and may be referred to by means of the Index.

Prevention of the many forms of ill health that fall under the head of diseases peculiar to women consist in: (1) **intelligent hygiene** in regard to the whole body, the mind and the emotional nature; (2) **avoiding** borrowing trouble (unnecessary or useless worry); overtaxing the strength by too heavy or too long work; race-suicide; patent medicines and all kinds of quackery; and (3) **having** proper clothing and exercise; fresh air; proper food; regular hours of sleep, right amounts of work, rest and recreation; cheerfulness and pleasant occupation (the one that brings not most money but most satisfaction because it is agreeable and appropriate); a happy marriage, with children and the "simple life;" rest and warmth during the monthly periods; and good care during child-bed with sufficient time for recovering.

Simple Facts for Mothers and Daughters.

The two strongest instincts are: First, self-preservation, which preserves the individual; and second, the sexual instinct, which perpetuates the race. Self-preservation is the first law of animal life, but it is first in time only, because by the individual is the race perpetuated. But as the race is of more importance than the individual, so race-preservation comes first in point of importance. The first necessity in the life of an animal (and man is an animal, although much higher than all others, which are therefore designated "the **lower** animals") is **food**. The instinct that is most universal is **hunger**. Of even greater strength is that instinct which is concerned in the maintenance of the life of the race, namely, the sexual instinct, and it plays a large part in the life history of every healthy member of the race who reaches sexual maturity.

The lowest forms of life (protozoa or "first animals") multiply and are perpetuated through successive generations in a very simple way; such an organism, for instance an ameba, consists of a single cell, which under certain conditions simply divides into two new but similar though smaller cells, each complete in itself. Other forms a little higher consist of a number of cells (metazoa), and, very curiously, if such an animal be cut into several pieces each grows into

a complete new individual of the same kind. But ordinarily the cells are so "differentiated" (or specialized) that only certain ones can "reproduce" or grow into a new individual, which belongs to a younger "generation." In yet higher animals these "reproductive" cells are contained in a special "system" or group of organs and a new individual (offspring, progeny or "young") is produced only by the union of two cells, one from each of two individuals or "parents." These two reproductive cells are incomplete, really only half cells; they differ from each other and the two kinds of individuals from which they are derived differ somewhat from each other, constituting sexes, the male and female. The cell from the male is said to "fertilize" the female cell or "ovum." This mode of reproduction is known as **sexual reproduction**, in contradistinction to the **asexual** mode described above, in which a single cell develops into a complete individual. In some of the lower animals (e. g., fish and frogs) the reproductive cells unite and develop outside of the bodies of the parents, after extrusion from the latter. In others (birds) the union of cells occurs within the female, but development takes place after the egg has escaped from the body of the bird. Such animals are **oviparous** (egg-producing); the nourishment for the early growth of the young makes up by far the greater part of the egg, which is large. In still higher animals the development of the offspring is carried on within the body of the female or mother, and the young are "born alive" (**viviparous**, or producing living young). Many animals supply their young with nourishment (milk) furnished by a special gland (breast or mamma) for some time after birth. Hence such animals are termed "mammals," a class which includes man. For fuller details the reader may consult any good book on zoology.

It is only necessary here to point out further that the function of reproduction is limited to a part of the life-period. In the early years (up to 14 or 15) the individual is developing rapidly and there is no energy nor body substance to spare for any purpose not directly concerned in the welfare of the body itself; the development so far is all related to self-preservation. Even before the body has attained nearly its full growth, however, the very important function of race-preservation begins to be provided for—the sexual system develops, the period during which this development is going on being termed **puberty**; the **child** becomes a **youth** who, in turn, maturing or developing fully, becomes a **man** or **woman**—**sex** being then a marked characteristic. At the age of 45 to 50 the bodily vigor becomes limited, race-perpetuation ceases to be any longer a function of the woman.

In all the higher animals, man included, the development of the

sexual organs, and therefore, also, of the sexual instincts, occurs only after the previous development of those organs and instincts essential to the preservation of the individual. The period which elapses between the birth of the animal and the beginning of its sexual life varies with the length of the animal's life. The rabbit becomes sexually mature within a year after its birth; the elephant only after twenty years; the human animal after ten to fifteen years. The child is a sexless being, possessing only the rudiments of sexual organs, and the germs of sexual instincts. There are, therefore, no essential differences—mental or moral—between the boy and the girl. At a certain age—in our climate usually between twelve and eighteen—the sexless becomes a sexual being by the development of those traits, physical, mental and moral, which change it into *him* or *her*. The distinction between brother and sister, heretofore marked chiefly by peculiarities of dress and artificial customs, becomes natural and unmistakable. The angular awkwardness and innocent freedom of the girl are replaced by the rounded grace and conscious modesty of the woman; the boy is no longer a companion to be romped with, but an admirer to be enslaved. Man especially and woman only little less differ physically from the child not merely in size, and differ still more markedly from each other. His skin is rough and hairy; hers is smooth and hairless. He has an angular form, broad shoulders, narrow hips, strong muscles, large bones, thick skull, deep and harsh voice; she has a rounded contour, narrow shoulders, broad hips, a skin thickly padded with fat, a voice smooth and child-like. Man's physical development adapts him especially for an active existence; woman's whole physique is modified in relation to the perpetuation of her race. Man is strong and selfish; woman, weak and generous. Man naturally embodies the individual; woman, the race.

Transformation of the Girl to Womanhood.

The transformation of the girl into the woman involves mental and moral as well as physical growth—a fact not always appreciated by parents. The chief physical change consists in the development of the ovaries (or egg-producers); each contains, even at birth, thousands of very minute bodies or cells, the eggs. Each ovary is connected with the womb (or uterus) by a narrow tube, the Fallopian tube. During the earlier years of the child's life these bodies and their contents remain undisturbed; but at an age (which varies with climate, race and surroundings) between 8 and 16 years the ovaries

enlarge; several of these very tiny eggs swell, and finally one of them bursts its covering as well as the wall of the ovary. Meanwhile the other organs concerned in reproduction are likewise undergoing a new development; the womb, in sympathy with the ovaries, is swollen with blood during the ripening of the egg in the ovary. The climax of the process includes: First, in the ovary the escape of the ripened egg by rupture of its coverings; second, in the womb the escape of blood by rupture of the blood vessels. The egg is carried from the ovary along the Fallopian tube to the womb, and is usually carried with the blood from this organ out of the body; the girl menstruates. This is the local process and is accompanied usually by evidences of general disturbance—lassitude, peevishness, pains in the back and loins. Sometimes even convulsions or fainting fits occur. The breasts also, accessory organs of reproduction, exhibit an increase in size, and frequently become the seat of painful or other unusual sensations.

This condition—lasting usually one or more days—recurs after an interval often of great irregularity. One, two, three, even six months may elapse before a repetition of the process. During the period of two years, more or less, this transformation goes on. It is termed puberty and is the birth of the **woman**—during which the girl demands no less careful and assiduous supervision than the infant. During this period the girl is peculiarly susceptible to diseases of mind or body. Not only the ailments which inevitably arise from neglect to recognize the importance of the change at hand, but also diseases which affect other parts of the body with especial frequency at just this time of life must be guarded against. For it is a fact that, just as the infant is susceptible to disorders from causes which do not affect adults, so also the girl, during the infancy of her womanhood, is peculiarly susceptible to influences which do not affect her younger or her older sisters. The importance of this fact cannot be over-estimated. It has been scarcely as yet fully appreciated, though one of the greatest boons which has in recent years been granted to woman is the more general recognition of the necessity for special care at this, the dawn of her life as a sexual being. The changes and the perils at this period may be considered as physical, mental and moral.

Among the possible **physical ills** is the manifestation of constitutional tendencies and of hereditary taints which have lain dormant since birth. Too often the delicate child of consumptive parents, which has maintained fair health during its previous years, yields when this increased demand is made upon it and the first pronounced

symptoms of the fatal malady appear; so, too, insanity, epilepsy and a score of other affections, the tendency to which was imparted with the parents' blood or acquired through their ignorance, attack the girl at this her critical period, perhaps to overwhelm her at once or perhaps to secure a foothold from which they can never be dislodged. Then again there are certain ailments which seem to affect alike the children of robust or of delicate parents. Such is **chlorosis**, popularly known as the green sickness, because of the greenish tinge sometimes evident in the otherwise pale countenance. In this disease the blood is impoverished and there is extreme pallor. The beginning is insidious: lassitude, even prostration; disinclination for exertion or for society, and a capricious appetite often exist for a considerable time without other symptoms. Parents, perhaps even the physician, are puzzled; then follow indigestion, constipation, palpitation of the heart, pallor, irregularity, perhaps suppression, of the menstrual function. Sometimes there appear most curious and perverted tastes, such as for nibbling slate pencils, devouring pickles, drinking vinegar, etc.; mental perversities no less remarkable may arise, so that in a few months the previously healthy, rosy child becomes an irritable and irritating invalid; the alarmed friends consider that the girl is in a "decline," and talk of consumption and heart disease. It should, however, be understood that chlorosis is too serious and complicated to be entrusted to home remedies; the patient should be at once placed under the care of a competent physician. The disease is caused by a lack of air, sunshine, exercise and amusement; by anxiety, fear, or other emotions; by overwork, physical or mental. To avoid it, therefore, one needs to know only the cause.

Development of Sexual Organs.

Yet the most serious physical ills arising at this period are those affecting primarily the organs undergoing development. But too often at this time are laid the foundations of those ailments peculiar to women (and especially to American women) causing painful and irregular menstruation in the girl, sterility in the wife and invalidism in the mother. These ills may be traced usually not to any willful interference with these organs or abuse of them, but to an **over-zealous use and cultivation of other organs**. It is too easily forgotten that the girl is to become a woman, and that the time preceding and following the first menstruation should be devoted primarily to this change, to this development of the sexual functions, which must not be sacrificed to other functions. The girl therefore must receive other treatment than her brother; in him, sexual development is a

more gradual process, one which does not materially change the bent of his inclinations, the direction of his pursuits, nor his physical habits; which does not intrude itself upon his attention by any imperious calls; a change, indeed, of which he is often long unconscious. For the girl it is an introduction into a new world, or rather into **the** world, on the outskirts of which she has passed her previous years; it is the transformation of the caterpillar into the butterfly. For her there is no possibility of ignoring the change at hand; body, mind and soul unite in calling her attention to the fact of the hour; the strange, uneasy, perhaps painful bodily sensations, the mental languor and indisposition for accustomed pursuits, the indefinable longings and emotions, indicate plainly the dawn of the new existence.

Happiness of a Woman Impossible Without Physical Perfection.

The care of the child during the period of puberty requires no active interference with the sexual functions themselves, but simply the regulation of the other functions of body and mind, so that enough of the child's strength may be diverted from other into the new channels; this diversion of strength occurs in the natural state of the animal without artificial regulation or interference. Indeed, it must be insisted that the object of supervision, whether by parents or physician, is not to surround the girl with artificial barriers, nor to stimulate in any way her sexual development, but merely to remove those artificial barriers to development of full health which are an unfortunate part of our social customs; for it is a fact that the stimulants to excessive mental effort, inseparable from a high state of civilization, result in a neglect of the bodily functions. High mental and physical culture are not incompatible; but to secure their co-existence in the same individual both body and mind must be carefully and conscientiously trained. The tendency of modern life, particularly in the United States, is to high-pressure mental effort, without regard to the physical foundation necessary therefor. Nowhere in the world is the stimulus to mental effort so great and so widespread; nowhere are the rewards for successful effort so sure and so readily attained; nowhere are the opportunities and inducements for individual effort, the natural resources and advantages for collective enterprises, so abundant and attractive. As a result the burdens of life are most eagerly taken up at an age which was formerly regarded as scarcely that of discretion. As a further result, the preliminary training of

our youth of both sexes is crowded into a period utterly insufficient even for the modest attainments of our grandparents, and doubly inadequate for the acquisition of that knowledge which our modern schools profess to teach. The formal pleasures of society also are no longer restricted to adults, but are eagerly sought by and granted to children. The demands of society can be met only by a certain devotion to *fashion*, whose commands must, therefore, be obeyed by the children also. The theater and the novel are amusements as common for the girl as for the mother. In short, *precocity* is the order of the day. The girl of fifteen is but a copy of her elder sisters, indulging in the same pleasures and employments, which oftentimes severely tax their greater strength and more mature endurance. The result is inevitable: if at thirteen the woman buds and blossoms and for four years should have nothing to do which can interfere with her growth into womanhood, then to put her upon the same diet of amusement and employments as are suited to a woman of twenty, who has completed her sexual growth, must surely result in disaster and is irrational in the extreme. An infant fed upon beefsteak and potatoes could hardly escape dyspepsia and its evils; the child compelled to carry heavy weights has a deformed backbone and legs; the infant woman, under conditions adapted only to vigorous adults, and assuming a share of the physical burdens inseparable from the pleasures of society, can not escape the penalties as surely inflicted by the sexual as by other organs when abused. The average girl of thirteen has, usually, vitality enough to develop into a robust woman; but she has not vitality enough to accomplish both this task and the other things which are but too often thrust upon her. Either the physical development or the social accomplishments, or both, will be but imperfectly attained; and since the social duties are often performed by the ignorant girl and her misguided mother the deficit is left but too often on the physical side.

Yet we cannot charge social pleasures with the whole, nor indeed the greater part, of the abuse to which the budding woman is subjected; for the greatest enemy to the sexual health of our young women is the popular system of education. The theater and the ball are but occasional and by no means universal or imperative demands; the school is an unavoidable requirement. Our popular systems of education assume that boys and girls can properly be treated alike, and may be expected to do the same work in the same time and at all times. However true this assumption might be in childhood and in adult life, it is certainly wrong during the period of sexual development. The questions which agitate, and are agitated by our friends,

the advocates of women's rights, so called, are out of order here. The question of the **relative** superiority of man or woman is quite foreign to the present subject; the comparison of mental and moral powers of the two sexes is also here irrelevant. The **fact** is, that the girl has a much greater physical and more intense mental development to accomplish than the boy; moreover, she must complete that development in a shorter time than is allowed him; it follows that she cannot and should not be expected to devote to other functions, whether of mind or of body, as much energy as may properly be required of him during the same period. This fact, so very apparent upon the slightest thought, has been strangely ignored by parents and educators. Girls and boys, whether sitting side by side in the same school-room or pursuing parallel courses of study in different institutions, have been expected to work not only five days in the week, but also four weeks in the month. The boy can do it; the girl can—sometimes—but always at too great a cost to her future; yet it is expected of nearly every girl. She is spurred on by comparison with her male competitors to perform her school work at any cost. Too often the success of her school life is reached by the sacrifice of her physical perfection. How masculine is the usual woman who successfully usurps a man's place as lawyer, doctor, dentist, farmer or what not! The thousand ills which torment American women are due largely to the educational methods of our schools and colleges; such methods are not the only cause of female diseases, but they are an important factor. Strange as it may seem, this neglect of the peculiarity of the female organization has been nowhere greater than in institutions devoted to the education of women. The platform of woman's rights has not as yet been made to include as a plank the right to complete the natural bodily development—a right which involves a sufficient opportunity for the growth of the reproductive organs, and for the establishment of their periodical functions. To take precautions till menstruation has for the first time occurred is not enough; the period for its return should, even in the healthiest girl, be watched for, and all previous precautions should be repeated; and this should be done again and again, until at length the **habit** of regular, healthy menstruation is established. If this be not accomplished during the first few years of womanhood, it will probably never be.

It is the unanimous experience of physicians that cases of imperfect sexual development are usually found in girls with brilliant school records. The body can rarely fulfil two important duties well at the same time. To secure the best work from the brain, we must

rest the muscles and the stomach. The best mental effort, the best literary and scientific work is never performed in the first hour after dinner. A greyhound started immediately after a full meal, in the pursuit of a fox, does not digest his food so long as he continues the violent muscular effort of running; but when permitted to rest after his dinner, his stomach soon completes its task of digestion. He has strength and vitality enough either to digest the food or to pursue the fox, but not to do both things at the same time. Muscle-work and stomach-work must interfere with each other if attempted together. The digestion of the dinner slows the muscles, activity of the muscles slows the digestion. In order that the animal may run swiftly, the bulk of the blood must circulate in the muscles; in order that the stomach may digest properly, a large quantity of blood must circulate in the wall of the stomach. The animal does not contain blood enough to carry on great activity of both stomach and muscles at the same time. So, too, the development of the girl's reproductive organs requires the circulation of large quantities of blood in these organs. The mental energy necessary to prepare and recite her lessons demands the circulation of large quantities of blood through the brain. The girl has not blood enough for both lines of work at the same time. Menstruation slows her brain work and for the time being lessens it; study slows her menstruation. During the menstrual week the first business is menstruation, in favor of which study and other mental effort must be diminished. This, let it be remembered, should be the rule, not only at the first and second monthly periods, but also at every period for three or four years (perhaps always), or until, in other words, sexual development is complete. For if the brain be worked continuously, the ovaries will be slighted; and if slighted, the injury can never be repaired. **If the reproductive organs are not developed now, they can not be at any later period.** If imperfectly fashioned now, they can be only patched, and not perfected, later. Blood must be allowed to flow to these organs in ample quantity, even though the brain does not get enough to study very hard, nor the feet enough to dance very energetically; even if the corset-lace has to be loosened to accommodate the increased size of the ovaries and womb below and of the breasts above.

Every physician can point to students whose splendid brain development has been paid for by emaciation of the body, enfeebled digestion and weak lungs. Every biography of the intellectually great records the dangers they have encountered (and often to which they have succumbed) in overstepping the ordinary bounds of human capacity. It cannot be otherwise. The brain cannot take more than

its share, without injury to other organs. It cannot do more than its share, without depriving other organs of that exercise and nourishment which are essential to their health and vigor. It is in the choice of the individual to throw, as it were, the whole vigor of the constitution into any one part, and by giving to this part excessive attention, to develop it at the expense and to the neglect of the others. But a chain is only as strong as its weakest link. In the training of our girls the tendency has certainly been to defraud the sexual organs of their just due, during the earlier years of their development; to train the mind, without regard to the suffering which may be inflicted upon the whole body; to train the girl's mind, in fact, as the boy's is trained. The result is that the American woman is both physically and mentally a unique type of humanity, remarkable alike for vivacity, mental attainments, intellectual beauty of face and feature on the one hand, and for an appalling absence of physique on the other.

Painfully significant is the fact that the one department of medicine in which the American physician confessedly excels his European brethren, is the diseases of women; in medicine, as in other things, practice makes perfect; the skill of the American medical man is an unenviable commentary on the health of the American woman.

The ailments which affect the organs immediately concerned in reproduction are not, of course, known to the general public; yet the generally imperfect development of the accessory organs is a secret which is by no means confined to milliners and dressmakers, who are said to adapt not the dress to the figure, but the figure to the dress. If the only evil resulting from this imperfect development were the loss of beauty, it would not call for attention from the medical adviser; but imperfect development of the breast modifies not only the contour of the woman, but also impairs the health of her offspring, and usually implies, moreover, an unsatisfactory condition of those organs which are directly instrumental in the production of the new being. There is a marked change going on in the female organization at the present day, which is very significant of something wrong. In the normal state nature has made ample provision in the structure of the woman for nursing her offspring. In order to furnish this nourishment, pure and abundant, she must have vigorous and healthy digestive organs and a well-developed reproductive system. Formerly such an organization was very generally possessed by American women, and they found little difficulty in nursing their infants. It was only occasionally, in case where sickness of some kind had overtaken the mother, that it became necessary to resort to the wet-

nurse or to feeding by hand. The women of foreign birth or descent, especially those of European nationality living in this country, generally nurse their children. But how is it with our American women who become mothers? To those who have never considered this subject, and even to medical men who have never carefully looked into it, the facts, when correctly and fully presented, are surprising. It has been supposed by some that nearly all our American women **could** nurse their offspring just as well as not; that the disposition only was wanting, and that they merely objected to the trouble or confinement necessarily attending it. But this very indifference or aversion shows something wrong in the organization. When the physical system is all right, the mind and natural instincts are generally right also. It is a fact, however, that many of our women are anxious to nurse their offspring, and make the attempt; they persevere for a while, perhaps for weeks or months, and then fail, and often at awful cost to the health or even life of the precious child. There are still others who cannot nurse at all, not having development requisite even to make a beginning. Why is there such a difference between our American women and those of foreign origin residing in the same locality and under the same external influences? Why are infant foods so increasingly exploited, making vast fortunes? The explanation is simple: there is a want of proper physical development. The girl's energies have been devoted to study and mental accomplishment. Her blood has been unduly monopolized by her brain; the other organs and powers have been sadly starved.

"Worst of all, to my mind, most destructive in every way, is the American view of female education, the time taken for the more serious instructions of girls extends to the age of 18, and rarely over this. During these years they are undergoing such organic development as renders them remarkably sensitive. Today the American woman is, to speak plainly, physically unfit for her duties as woman, and is, perhaps, of all civilized females, the least qualified to undertake those weightier tasks which tax so heavily the nervous system of man. She is not fairly up to what nature asks from her as wife and mother. How will she sustain herself under the pressure of those yet more exacting duties which nowadays she is eager to share with the man?"—(Weir Mitchell.) "In our schools it is the ambitious and conscientious girls, those who have in them the stuff of which the noblest women are made, that suffer; not the romping or lazy sort; and thus our modern ways of education provide for the **non-survival** of the fittest. Girls of bloodless skins and intellectual faces may be seen any day among the scholars of our high and normal

schools—faces that crown curving spines which should be straight, and skins that cover neuralgic nerves that should know no pain. Later on, when marriage and maternity overtake these girls, they bend and break beneath the labor like loaded grain before a storm, and bear little fruit. A training that yields this result is neither fair to the girls nor just to the race.”—(Clarke.)

It must be remembered, also, that the reproductive system is the key to a large part of the mental and moral nature—to all that makes a woman womanly. At about 45 years of age the sexual organs of woman cease their accustomed activity; and it is a fact familiar to all that at that age a woman loses the chief, indescribable charm which she has previously possessed. Her physical vigor and intellectual accomplishments are retained undiminished, but she is no longer a perfect woman. So, too, those unfortunate females who are condemned by disease to suffer loss of the ovaries, become, like the women who have had the change in life, sexless creatures. Woman's entire being in fact, mental and moral, as well as physical, is dominated by her reproductive powers. Therefore, if these powers are never completely developed, there must be an arrest of development of the mental and moral nature. It is, then, not alone for the welfare of her body that the dawn of the girl's sexual life is important. In the changes accompanying the development of the sexual system at puberty there is exhibited a most remarkable example of the intimate sympathy between the brain and the ovaries, between the mind and the reproductive powers. The change in the disposition and character of the girl at this time is by no means limited to the reproductive system; for there appears at the same time a new nature, comprising the highest sentiments of humanity, social, moral, and even religious.

Hygiene of Puberty.

The care of the girl during puberty relates directly, of course, to her bodily functions, but just as certainly to her mental state. Certain rules should be observed throughout the whole of puberty, and certain additional precautions be taken during each menstrual period. And the first requisite is **food**; attention should be paid to both quantity and quality of the food during this period of development. For the girl's appetite is often very capricious; she is sometimes, though rarely, inclined to excess of food. A more common and more serious error is either positive disinclination for nourishing food, or the refusal of all except particular articles of diet—cakes, pastry and sweetmeats. No special regimen nor line of diet is necessary, but the

girl should have an abundance of nourishing food at regular hours; she should, and probably will, have a marked increase of appetite, for which she should not be teased; but which, indeed, should be encouraged; for during these few years the demands for nourishment are usually great. It is a most unfortunate and mistaken delicacy which would refuse nature's demands at this time.

Meat, especially some fat meat, the usual garden vegetables, fruits and milk, may constitute the bulk of her diet. Tea, coffee, wines and condiments—at no period of life especially advantageous—may be positively injurious during this stage.

Next most important in the building of body and brain is **sleep**. "Early to bed and **late** to rise" is here a wise modification of the old saw. The hours that the girl may apparently lose by lying in bed at this period of her life will be redeemed later a hundred-fold in her more mature and valuable years.

Exercise, too, is an indispensable aid in the development during puberty. No rules can be laid down for this. Only that activity of body which gives the child pleasure should be regarded as exercise. Where exercise ends and work begins must be determined by the individual tastes, strength and surroundings in each case. Yet this is, of course, a matter which can always be judiciously regulated by the parents. Two facts only need be mentioned here—that, to be beneficial, exercise must be taken in **fresh air**, whether indoors or out; and that the human animal, like other animals, must have for its best development the life-giving rays of the sun. The girl needs no complexion yet: she should have her sun-bath daily without a parasol, even though she become as brown as the traditional Indian. Not the least advantage of physical exercise, undertaken, as it naturally is, with companions of the same age, is that it diverts the girl's attention from the changes going on in her own nature, prevents her from brooding upon mysteries of which as yet she can have no comprehension—in short, assists her in remaining a child until childhood has passed. Exercise also is one of the best safeguards against the vicious habits to which girls, as well as boys, frequently become addicted during these years of life. Such habits acquire particularly strong hold upon those who, from lack either of opportunity or of inclination, have not enjoyed the outdoor exercise so natural to children of both sexes at this time of life.

Clothing, too, is a matter of extreme importance, and one which cannot be passed over in discussing the hygiene of puberty. So long as the girl remains a child, so long will she suffer only immediate and direct effects from the present curious fashion of dressing girls.

It has doubtless puzzled every one who has considered the question, by what law of nature or art the clothing of a girl previous to 12 years of age should be bunched around her waist, while her neck, arms and legs are nearly or quite unprotected. Her brother, who is quite as vigorous and able to withstand the weather as she, is clothed from the neck to the wrists and to the ankles. The girl's costume is adopted, with slight variations, by the ballet-dancer with the purpose of exhibiting her physical charms; yet that cannot be the object in thus clothing the girl of ten years, since she has no charms to exhibit, other than could be displayed to the same advantage by her youthful brother. But this prevalent fashion of clothing children before puberty need not be further considered here, since the ill effects (the imperfect protection against the weather) are perfectly apparent. With the commencement of puberty the girl's dress changes; yet oftentimes not to the extent that the interests of her body demand. It cannot be too earnestly insisted upon that her entire body should be at all times, but especially during the menstrual week, thoroughly and warmly clothed. Thick shoes and woolen stockings may not be so esthetic, nor always necessary, but certainly they are often needed and not used. Neck, shoulders, and the figure generally will be more attractive in after years if carefully and properly clothed now. It is not meant that girls should be overclothed, but only adequately.

At this time, too, the girl is inducted into that peculiarly feminine garment, the **corset**. It is not the purpose here to indulge in a tirade of abuse of this most useful article of feminine apparel. Every medical man, as well as every woman, can understand the advantages from the use of the corset; it is **not the use but the abuse** of it which has been the cause of so many attacks upon it. A corset with shoulder-straps so that the weight of the skirts attached to it are borne by the shoulders and not by the hips and abdomen; a corset which permits a perfectly free expansion of the chest in breathing is devoid of all objections and is eminently useful. Just so far, however, as the weight of clothing is borne at the waist, and so far as the expansion of the chest is restricted by the corset, just so far is the garment injurious and objectionable. At present the corset suspended from the shoulders is the rare exception; and within the last few years the corset has had to sustain not only the weight of the many skirts, but has also been continuously dragged downward by suspender garters, two elastic bands fastened to the stockings. Then again, though no woman admits that the corset impedes her breathing in the least; though every woman can prove most conclusively to herself, by inserting her hand within the corset, that her waist has

ample room in the garment, yet it is equally true that no dress habitually worn over the corset can be made to meet if the latter be removed—except, indeed, by especial effort on the part of the wearer. It is not meant that no pressure can be borne without injury by the mature woman; but it is certain that the position of the womb and ovaries in the body is apt to be modified by unnatural pressure of clothing during the period of sexual development; for these organs rapidly acquire additional size and weight at this time, and if in addition they are forced downward by the other organs contained in the abdomen (these being displaced by a tight corset and heavy clothing) they will be found, at the end of puberty, not in the position and condition natural to them, but much lower in the pelvis, and often unnaturally congested. There often results the condition commonly known as falling of the womb, so often accompanied by derangement of the menstrual function.

When properly used the corset is unobjectionable, and is indeed at times most valuable; yet during at least the first years of puberty, the girl has no need for such support, and her appearance is not improved by an article whose chief use appears to be to hold in position artificial substitutes for the breasts which are not yet developed. These pads have, from the physical standpoint, a very serious objection—they but too often defeat their own object; for by pressure they may prevent the breast from acquiring the size, shape and firmness natural to it.

So long as women believe that physical beauty increases as the size of the waist diminishes; so long as they labor under the delusion that men admire small waists, just so long will the corset be employed as a straight-jacket—health, hygiene, advice, remonstrance and doctors to the contrary notwithstanding. The doctor has, it is true, a certain though not very noble satisfaction in this matter—he knows that the woman who persistently, perhaps even contemptuously, disregards his advice in the matter, will in future years be a valuable patient, needing long, expensive treatment at his hands. If women could be convinced that the compression of the body by a tight corset is as barbaric as the compression of the China woman's toes by a tight shoe, and that the fashionable figure of the modern woman is a wide departure from the ideal of nature and true art alike; also that the figure of the average fashionable woman is not the ideal form desired and admired by the average man, there might be hopes that the corset would be loosened, and that the growing girl would have an opportunity for unrestricted, healthy physical development.

Another important thing during puberty is the **regular** evacuation

of the bowels and bladder. If either the rectum or the bladder be habitually distended, there is apt to result a change either in the shape or position of the womb. In treating diseases of the womb, the physician has in almost every case to secure proper action of the bowels; and usually it is found that torpidity of the bowels has endured since puberty—that **the habit of constipation was formed** at that period of life. As a rule habitual constipation cannot exist if proper care and attention be exercised. There should be no false delicacy about this; these functions must not be regarded, as they sometimes are, as relics of the primitive and barbarous state of man, to be slighted and neglected, and performed only when further neglect becomes impossible. All children should be taught that the regular evacuation of the bowels and bladder is a part of the daily duties to one's self. Medicines are rarely necessary if the habit be formed in childhood and always followed.

Care During the Monthly Periods.

During puberty occurs the rapid development of those important functions whereby the girl is transformed into the woman; the monthly changes are the periodical crises of this epoch, marking the successive steps of the transition from childhood to womanhood, and during these monthly periods everything should be subordinated to this function. Other organs, therefore—body and mind, brain and muscle—should be rested. The first law of the menstrual period is **rest**. Not absolute repose is demanded, but merely avoiding anything to which the girl's strength is inadequate or her mind indisposed. She should do less than the usual work, and take less than the usual exercise, whether for pleasure or profit, whether in walking, riding, dancing, or domestic employment. No less important is freedom from mental effort and anxiety. The girl should be kept out of school one or more days during each period, particularly if she be ambitious and studious. In many cases it is absolutely necessary to withdraw the child from school during the earlier months or years of puberty.

The **warmth** of the body should be carefully and evenly maintained. At no period of life is so much damage apt to follow wetting the feet, sitting in a draught, etc. Yet, while a moderate and uniform temperature is so very desirable, the girl should not be kept in a close, hot room. Fresh air is always necessary. Nor should the customary baths be omitted during this period. With care to avoid extremes of temperature, there is no occasion for deviation from the usual custom. The bath should have a temperature of 75° to 85° F.

Extreme emotional excitement of any kind should be avoided at these times, whether due to actual occurrences or merely called into action by reading a novel. For no part of human nature is so intimately associated with the sexual organs as the emotions. The emotional existence is largely founded upon the sexual power and function, and no part of the animal organism is so easily and seriously deranged by undue exercise of the emotions. Familiar to most women is the fact that the menstrual flow, even in the mature woman, can be diminished, arrested or increased by various emotional excitements during the monthly period.

Between the monthly changes no other precautions are necessary than have been already indicated, and these are suggested and directed by the one dominant fact that at this period of life the girl's best occupation is securing a proper, fully developed body.

When Puberty is Delayed.

In the United States the first menstruation occurs on the average between the ages of 14 and 15 years. There are, of course, numerous exceptions; menstruation not infrequently occurs at 12 or 13, or is delayed until 16, 17 or 18. These variations from the average are perfectly consistent with health and with proper development of the sexual organs; neither the early development nor the long delay need cause anxiety nor medical interference. While every girl is a law unto herself in this particular, yet certain influences are known to modify the rapidity of sexual development. Foremost among these is **climate**; the average age of sexual maturity in women is greater the cooler the climate. In a mixed population like that of the United States, where individuals of the same family may represent ancestors from different races, the women of dark complexion retain not only the dark hue common to the people of tropical climates, but also the tendency to mature sexually at an earlier period than their fairer sisters, whose complexion suggests relationship with the more slowly developing races of the North. It is generally true also that girls of large frame, whose general development takes longer, experience puberty at a later age than their smaller sisters.

Race, too, shows certain differences in the period of sexual maturity. Races probably arose from differences in climate and natural surroundings, yet even in our own country, exposed to identical conditions of climate and temperature, the dark-eyed Jewess and the dark-skinned negress attain sexual maturity one, two or three years earlier than the girls of other races.

While inherited tendencies largely determine the exact period of puberty, yet individual influences may hasten or retard it to some extent. Idleness, physical and mental; stimulating, highly-seasoned foods; stimulation of the emotions by reading fiction, by the theater, and by the society of the opposite sex; by association with older girls blessed with long dresses and lovers—these and similar influences, the atmosphere of more mature years, which the child is often unwisely allowed to breathe, will hasten her sexual development. This is shown by the fact that girls born and bred in the country reach sexual development later than those in the city. Not only does the first menstruation occur six or seven months later in life in the country than in the city girl, but puberty also, when once inaugurated, proceeds more slowly. The peculiarities of city life which stimulate the feelings while repressing the physique explain the earlier, quicker and less complete sexual development in the city girl as compared with her country cousin.

In some the first menstruation is followed in twenty-six or twenty-eight days by the second, and subsequent ones appear at the interval common in mature years. A considerable interval, however, sometimes even six months, may follow the first before the appearance of the second menstrual flow, and that, too, without the occurrence of pains in the back, or other symptoms common to such occasions. In such cases menstruation seldom becomes regular during the first year or two of puberty. This condition requires no interference by either physician or parent. The process of ripening is merely proceeding more slowly, though no less surely, than in other cases. So long as the menstrual flow is accompanied with no more than the usual general disturbance, and the girl's general health remains unimpaired, her sexual development will go properly on without artificial means.

Differences also exist in the intervals elapsing between the menstrual periods; while the average time is twenty-six to twenty-eight days, in some healthy women the interval is sixteen to even forty days. This need occasion no anxiety nor interference, provided the interval is of reasonable regularity. It sometimes happens that after child-birth the monthly periods become regularly longer or shorter than they were before.

The length of time during which the flow continues also varies in different individuals, and, indeed, in the same woman to a less extent, without significance of disorder of health. While the general average in our climate is as about four days, some flow six, others only two, or even one day. So, too, the quantity of blood lost at each menstrual epoch presents similar variations within the bounds of health—four

or five ounces being the average. In these respects also the same general laws prevail as in the development of the function in general. In a warm climate the average flow is greater and the interval shorter; in colder climates menstruation is generally less frequent and less profuse. Social surroundings and personal habits also have marked influence in this regard; the same factors which induce early menstruation usually cause more frequent and profuse discharges. The youthful devotee to "society," so called, is not infrequently annoyed by menstrual irregularity, which her country sister—a stranger perhaps to household and table luxuries—escapes. In general, the more robust and vigorous the individual the less is the interference with the general health at the menstrual period. It is usually the weak, nervous, delicate women—those indulging in luxury and emotional excitement—who are most subject to profuse and frequent menstruation. There is one point of importance—the menstrual blood never clots when this function is normal; clotting of the blood indicates something wrong in the organs concerned.

Menstrual Disorder.

Dysmenorrhea.—There is no exact line separating painless and painful menstruation, since few women subject to the various unnatural influences of our artificial society escape entirely more or less pain at the menstrual epoch. We may assume that in the natural state menstruation, like all other bodily functions, is a painless process—an assumption supported by our knowledge of this process and its analogues among the lower animals and the lower races of mankind. A certain amount of pain felt chiefly in the small of the back accompanied with headache, languor, and perhaps painful sensation in the breasts, is regarded as natural; and no interference is necessary unless the general health of the girl is at the same time obviously impaired. In these cases there is usually a certain amount of languor, and even pain in the intervals between the monthlies—a symptom which demands immediate attention. In general, painful menstruation is caused by one of three conditions: First, a lowered condition of the constitution, originating either in the blood or in the nervous system, with a tendency to neuralgia; second, a disordered state of the womb; and third, an abnormal condition of the ovaries. In girls dysmenorrhea is usually due to the first of these causes, seldom to the second and third. Chlorosis, or the green sickness; physical exhaustion, whether due to over-work or over-indulgence in social pleasures; mental exhaustion from excessive study and emo-

tional excitement are the common causes of the poor health. In some cases the pain is due not to any diseased condition but to a tendency to rheumatism or gout. It is important to note whether the pain occurs chiefly before the beginning of the flow and ceases with its appearance, or whether the pain keeps pace with the amount of blood lost, increasing, therefore, during the first day or two of menstruation; also any appearance of clotting, or reddish particles contained in the discharge; also whether the pain be felt chiefly in the back or in front; whether it be continuous or be felt at intervals and accompanied with straining—resembling the so-called bearing-down pains; also whether a whitish or yellowish discharge precedes by one or more days the proper menstrual flow.

The causes of painful menstruation are various, and the treatment must vary in different individuals. Indeed here, as elsewhere, it must be borne in mind that medical treatment is intended not to destroy a disease, but to assist an individual who is subject to a disease; therefore, not the disease, but the patient is to be treated. We must know what causes the pain before attempting to remove it. And since the causes can be generally definitely and accurately located only by the special knowledge and skill of the medical adviser, it is impossible to lay down any set of rules for the treatment of painful menstruation. But there are certain measures which are decidedly useful in diminishing the pain, and therefore beneficial in nearly all such cases, even though they do not remove the cause nor prevent the recurrence of the pain at the next period. Such are wearing flannel next to the skin not only during but also between the monthly periods; taking special care to avoid exposure to cold and wet for several days before the monthly is expected; lying down during at least the first day or two of the flow; the application of flannels wrung out of hot water to the small of the back and lower part of the abdomen. Sometimes a light mustard plaster may be applied to the abdomen with even greater advantage (see Mustard Plaster). A bottle of hot water or a hot flat-iron wrapped in flannel may be applied to the small of the back and to the feet if the moisture of the plaster or hot cloth is disagreeable. If the pain is still excessive, a teaspoonful of paregoric or ten drops of laudanum may be administered. But as a rule, laudanum and other opiates, alcoholic stimulants, whisky slings and other remedies, should be as far as possible avoided; because, since more or less relief follows their employment, the girl will acquire the habit of resorting to them every month, thus prolonging and rendering permanent the unnatural condition of the sexual organs on which the pain depends and running a very serious

risk of becoming a "morphine fiend"—a most terrible calamity. It is advisable to consult a physician at once, if the employment of the hot flannels and other local remedies mentioned is not followed by relief without any resort to medicines. It is a popular idea that such cases are benefited by marriage and maternity; and such is undoubtedly the case in one class of painful menstruation. But marriage cannot be advantageously prescribed for all. Indeed, many such cases suffer an aggravation of the menstrual difficulty upon assuming the duties of the wife and mother.

Another disorder of menstruation which may occur, though less frequently, in the maiden or in the matron, is **menorrhagia**—an excessive loss of blood during the monthly sickness. Another disorder, often traceable to the same causes, is the appearance of blood in the interval between the regular periods; this is **metrorrhagia**. The causes of profuse menstruation are: First, those associated with the womb itself, and, second, those dependent upon constitutional conditions. Among the former are displacements of the womb; changes in its shape; inflammation of the lining of this organ; the formation of tumors upon and within it; the retention in the womb of fragments of the after-birth; the large size of this organ after a pregnancy, often resulting from getting up and indulging in work and exercise too soon after delivery. The causes not referable directly to the uterus, and especially frequent in girls or unmarried women, are general debility from emotional excitement, improper physical and mental training, etc. As already indicated, domestic remedies must consist in the avoidance of errors of diet, clothing, exercise and habits, and during the menstrual week of lying down most of the time.

Suppression of Menstrual Flow.

Another condition—one which causes mothers much anxiety, often needless during the girl's teens—is what is popularly termed **suppression** of the menstrual flow—the failure, partial or complete, of the monthly sickness to appear at the expected periods. It should be remembered that during the first years the menstrual flow **rarely** has the same regularity of time, duration and quantity, which is usually manifested in the woman's more mature years; a girl may skip a period or two without cause for alarm or interference, unless there be other evidence of derangement. A girl's monthly flow may last but a day or two, quite consistent with perfect health. If, however, the flow diminish much or entirely disappear in one who has previously menstruated regularly and profusely, and if at the same time occur other evidences of imperfect functions—such as headache,

nausea, pain in the back, loss of appetite, inability to sleep, and unusual sense of exhaustion—measures should be taken to promote the menstrual discharge. It will usually be found that the cause is in the general health and not in any diseased state of the sexual organs. The treatment must, therefore, be directed to the constitution.

Partial or complete suppression of the monthly flow, termed **amenorrhea**, is frequently found in patients suffering from consumption, chlorosis, and heart disease; but it is also quite frequent among the indolent and luxurious among the higher (?) classes of society, in whom the menstrual function is but one of the many functions habitually performed but imperfectly; there is no flow, merely because the woman's body does not produce nor contain blood enough for the purpose. In such cases treatment is to be directed to the restoration of the general health and to the avoidance of those injurious influences due to persistent devotion to "society." If it be possible to restore the color to the cheek and flesh to the body, the menstrual flow will usually appear at once in proper quantity and at proper times, without any attention to the sexual organs. At times, however, it may be desirable to encourage the flow by promoting the flow of blood to the lower abdominal organs; this may be accomplished by the application of hot cloths, a gentle laxative, and careful friction and gentle kneading of the abdomen and loins, followed by rest and quiet; or by a hot hip-bath of fifteen minutes' duration.

In discussing the more usual physical disorders associated with the performance of the menstrual function in the earlier years of womanhood, we have assumed that the child is naturally formed in all parts, and that no other influences than inherited tendencies and errors of training have interfered with the proper performance of the menstrual function. However, nature exhibits occasionally certain freaks in this, as in other parts of the body—freaks which, when undetected, or even unsuspected, may occasion considerable anxiety and difficulty. In some, who exhibit the other characteristics of fully developed womanhood, menstruation may not appear; indeed, cases are on record in which women have married and borne children without menstruating, the monthly flow appearing, perhaps, only after the birth of one or more children. In other cases there is a mechanical obstruction to the escape of blood from the womb—a membrane which closes completely instead of partially the natural orifice of the parts. In these instances the usual symptoms of the monthly sickness, such as headache, pain in the back, and languor, recur at regular intervals, though no blood can escape; after a number of months the accumulation of blood in the vagina and womb may be so great as to give

much pain and even to cause an enlargement of the abdomen, and give rise to an unjust and cruel suspicion of incontinence. It is scarcely necessary to state that a watchful mother would early detect the unnatural formation by simple inspection of the genital organs. This discovery should be made early, because the condition can be at once and very simply relieved without any danger to the girl, if but few menstrual periods have transpired; while on the other hand, after some years, when the accumulation of blood is great, while an operation may allow the natural performance of the function, yet there may be changes which can not now be overcome but which were slight and would have disappeared themselves within the first or second year of menstruation.

It sometimes happens that in a girl otherwise well and perfectly developed, one or more of the sexual organs fail to undergo the change of puberty, and remain in the undeveloped condition natural to the child; indeed it may happen that some of these organs are entirely absent. Such an individual can never hope to perform the duties of the wife and mother. If the sexual organs be all present the girl may ultimately become a woman even at the advanced age of 24 or 25 years—there being merely a delay, and not an arrest of development. On the other hand, sexual development sometimes occurs at a remarkably early age. Thus instances are on record in which the peculiar physical changes, including the monthly discharge of blood, began at five, at three and at two years; indeed two cases have been recently reported in which menstruation began with the life of the infant. That sexual development actually occurs in such precocious children is shown by the fact that girls have become mothers at nine, even at seven years of age.

Medical Examination if Suspicious.

Tumors connected with the ovaries or the womb are occasionally developed during puberty, and may give rise to excessive and irregular menstruation or may even cause a complete suppression of the courses. Instances have been observed in which a sudden cessation of menstruation, followed in a few months by enlargement of the abdomen, has been construed, notwithstanding the unfortunate girl's tearful denials, as evidence of pregnancy; and although in the majority of such cases—tearful denials included—the suspicion is well founded, yet the possibility should be borne in mind that suppression of the courses, enlargement of the abdomen, and other symptoms usually produced by pregnancy may also be caused by a tumor of the abdo-

men; and that in any doubtful case the girl should have the benefit of the doubt and be submitted to medical examination before so great a disgrace be attached to her fair name.

The care and attention which may be properly bestowed upon the girl's body during the trying period of puberty has been outlined above. Yet a not less important duty of the mother during these same years is the training of the moral nature. This does not belong, of course, essentially to the medical adviser, nor will it be discussed here. Yet one suggestion should be made by the physician, since he is so often called upon to treat cases arising from defects of moral training. At this time of the girl's life there is an imperative need for the most intimate and intelligent sympathy between mother and daughter. At no time in the life of the girl has she more pressing need for guidance, support, encouragement and affectionate solicitude; at no other time is she so completely dependent upon members of her own sex for tender sympathy and wise advice. She is entering an unknown and strange realm. She is assuming duties and powers which she would often gladly escape; she is bewildered, perhaps overwhelmed, by new emotions and desires which she is often unable and unwilling to direct and control. These various circumstances which increase her need for sympathy and affection constitute at the same time a barrier between her and her male relatives. In these, her new trials and troubles, she cannot make confidants of father and brothers as has been her habit hitherto, for however tender their regard, she feels instinctively that they can have no intelligent appreciation of her situation; she must seek solace and counsel from woman, and of all women, most naturally and best from her mother. Yet the experience of physicians often shows that the mother's advice and assistance have been very tardily and even grudgingly bestowed; the entire matter has been ignored as far as possible, perhaps even until the girl has been terrified by the sudden appearance of her first menstrual flow; she has been taught to regard her sexual functions as an evidence of total depravity, a part of the original curse in the garden; something to be ashamed of, repressed, neglected; and not infrequently in such cases the girl's knowledge of the powers and possibilities of her future sexual life have been derived, in large part at least, from her playmates and school companions. In very brief conversation with the child the physician readily perceives whether her information has come from her mother or from other sources, for in the latter case there is apparent a false delicacy, a furtive air, a tacit belief that the whole subject belongs in the realm of forbidden fruit. The child plainly betrays by her manner a consciousness of guilt in

knowing anything about the subject at all, and often affects ignorance of matters which she evidently understands. It may perhaps be true in the abstract that the girl should be kept in ignorance of the sexual relation; of the significance of the changes which she is now undergoing; yet it is quite certain, as a matter of fact, that she will **not** remain in this state of ignorance. It is practically certain that the information will be obtained through either proper or improper channels, and it is surely far better that she should hear the truth from her mother; that she should be impressed with a solemn sense of the dignity, responsibility and yet danger to body and soul, inseparable from her sexual powers; that she should form correct habits; that she should be inspired with a deep sense of the high nature of her new duties, and be led to regard these as the crown and glory of her womanhood. This is certainly far better physically, mentally and morally than that she should learn from wrongly instructed girls that the prime object and use of her sexual powers is sensual gratification; that marriage is on the same moral plane as licensed prostitution; that maternity is the unwelcome though inevitable result of the sexual instinct; for if the girl entertain such ideas she will certainly not confide in her mother that implicit trust so essential to her own safety. She will brood and dream in private over the great mystery thus revealed. This unfortunate and mistaken impression is but too often strengthened by the mother's neglect to allude to the subject—a neglect due either to false delicacy or to the erroneous belief that the girl is as yet but a child and cannot comprehend such matters; a silence which may be interpreted by the girl as a tacit confirmation of her suspicion. The girl of 14 or 15 should, of course, not be instructed in all that pertains to the sexual relations. In order to secure the complete confidence of her daughter, the mother must impart, and that, too, early in puberty, at least some of the elementary truths as to the meaning of sexual development. Let her not beguile herself with the belief that the matter is better postponed until the child has acquired more experience and discretion; the question is merely whether the information shall be conveyed in the delicate spirit and pure motive of the mother, or clothed with the degrading influences of doubtful jest and innuendo.

Secret Vice.

Secret Vice.—If mothers generally early instructed their daughters as to the significance of puberty, it would be scarcely necessary here to allude to a topic which, under present circumstances, cannot conscientiously be ignored, namely, indulgence in secret bad habits.

Probably every mother who reads this line recoils in disgust at the idea of associating her own daughter's name with such a possibility; for every mother believes, naturally, that **her** child is too pure in mind ever to conceive or practice a habit so loathsome; but be not deceived. Certainly this belief is partly justified—probably very few children have ever of themselves formed such habits; and if the habit was limited to the few precocious enough to discover it independently, and practice it voluntarily, it would scarcely be necessary to mention this repulsive subject here. But the fact is, that the child rarely escapes a knowledge of this, communicated by older playmates, servants, and even nurses. In many cases the girl or boy is instructed in such unnatural acts at a time when she or he is incapable of understanding their significance, and even physically incapable of experiencing any pleasurable emotion from them; the child is, therefore, not only ignorant of the physical wrong, but is also quite innocent of any consciousness of moral impurity. Miss Catherine Beecher long ago sounded the note of warning to parents, and this warning has been often repeated and confirmed in popular publications by medical men; yet parents are not yet fully awakened to the wide-spread prevalence of this habit among the youth of either sex. Wherever children between twelve and sixteen years of age habitually congregate, there the habit is very apt to be more or less rife. In every school, especially boarding schools, where children are withdrawn from the ennobling influences of personal contact with their parents, and in every crowd of boys, or even girls, there will be found one or more individuals who are not content themselves to practice this habit, but are sure to impart a knowledge of it to their companions, many of whom, unconscious of any wrong, are easily induced to imitate them. Almost every physician meets cases in which the innocent child has been instructed in this vice by the servants in her father's house, perhaps even by her governess.

The physical and moral effects of indulgence in this habit are greatly exaggerated and misrepresented in the circulars and books with which the country is flooded by patent medicine venders and other quacks, but they are, nevertheless, dire enough. Among them are loss of appetite and flesh, bodily and mental weakness, nervousness, and disorders of the sexual and urinary organs. Perhaps the most disastrous is the moral effect, for this unnatural and premature excitement of the sexual organs necessarily directs the child's thoughts into improper channels, and may dispose the girl to become a ready victim to profligate arts in later years.

Nowhere else is prevention so much better than cure as in this

habit. Once acquired, it seems sometimes impossible to break it. In some cases it is necessary to resort even to mechanical restraints, such as tying the hands. Yet if the child is addicted to this unfortunate habit, a cure would be best effected, in most cases, certainly not by severe censure and harsh reproof, but by kind sympathy and affectionate treatment. Oftentimes, doubtless, these measures, directed by a mother's tact, will suffice. Local physical causes which can keep up an irritation of the sexual organs should be looked for; for it is a fact that, in exceptional cases, the habit is maintained, perhaps even generated, by local disease of the womb or of the skin of these parts; by worms in the lower bowel, and by imperfect attention to cleanliness. The inclination may be diminished by hard beds, light bed-covering at night, regular evacuation of the bowels and bladder, especially late in the evening; sometimes, also, ablutions with cold water, shortly before retiring, may be beneficial; in a word, good hygiene and plenty of occupation—play or congenial work—so that the child has no time to do wrong. If these simple measures, and judicious advice and restraint by the parents, fail to abolish the habit, a physician should be consulted; this is a matter too serious to be neglected or hidden.

Vice Habit Can Be Cured.

If the girl converse with her mother as freely about her sexual functions as about the action of the bowels, it is rarely the child will acquire or attempt to conceal such habits. It is, of course, not necessary, then, to warn the child particularly against these habits, as that may excite an unnatural curiosity for further knowledge, but merely to instruct her in a general way that any handling of these parts is degrading and injurious.

The habits in question are usually acquired during or after puberty, yet cases have been observed (in boys more often than in girls) in which children, at an age usually incapable of sexual excitement, even infants in arms, have habitually performed such acts, by movements of the thighs and of the body; and the habit is not infrequent among children before puberty.

Leucorrhea.—A condition often found in girls, though by no means confined to them, is a discharge known as "the whites," technically called **leucorrhea**. In married women this discharge is usually a symptom of disease of the womb. In girls leucorrhea often occurs without any disease of the womb, the discharge being entirely from the vagina. It is most common after puberty, but may occur from eight to fifteen years of age. As a similar discharge occurs in venereal

disease, there sometimes arises a suspicion that the girl has, voluntarily or not, been brought in contact with some one suffering from this disease, and physicians are sometimes consulted by anxious mothers as to the possibility that their children have been tampered with by others. If such be really the case, there will usually be other and unmistakable evidence; the discharge alone does not warrant any suspicion of contact with others. In girls between eight to eighteen, the discharge, though usually white, has sometimes a tinge of yellow, or even green; is sometimes so slight as merely to attract notice by stains upon the linen, at other times so profuse as to occasion great annoyance. There is usually no pain, though sometimes a slight burning sensation is felt just before and after the menstrual period; the monthly is itself often irregular, both as to quantity and time; the general health is usually somewhat impaired; the individual is pale and languid—suffers from constipation, irregular and ill-defined pains in different parts of the body, especially the loins, loss of appetite and sleep.

Causes.—Leucorrhea as it occurs in girls usually indicates merely a relaxed condition of the vagina, dependent most always upon an impairment of the general health. It is especially frequent in those scrofulous children. Such children often have red, watery eyes, and oftentimes excessive secretion from the nose. In such the discharge from the vagina is to be regarded in the same light and treated by efforts to improve the general health, by proper attention to diet, air, exercise, etc. In other cases, leucorrhea is the result of improper habits of living, and is especially frequent in girls in large cities who receive too little fresh air and sunshine, live in hot and ill-ventilated rooms, and wear clothing which does not protect from cold and wet. The general use of woolen underclothing and stockings, and of thick shoes, would go far toward preventing leucorrhea in girls. Sometimes the cause is to be found in excessive mental strain, whether of the intellect or of the emotions. Leucorrhea is especially frequent among so-called nervous girls. It is frequently also a symptom of chlorosis.

Treatment.—The treatment of leucorrhea must begin with an investigation of the girl's habits of body and mind and of her general health; in most instances the discharge ceases without any local treatment, on securing nourishing food, warm clothing, appropriate physical and mental exercise. Locally, it rarely becomes necessary to do more than secure simple cleanliness, and it must be borne in mind that reliance must not be placed upon local treatment to the neglect of those general rules of health and hygiene already indicated. If

the discharge be like the white of an egg, it will be sufficient to employ, morning and night, a simple injection of lukewarm water, a quart of which may be slowly injected by means of a Davidson syringe; if, after several days, the discharge still continues, two tablespoonfuls of alum may be dissolved in the water before injecting. Regular movements of the bowels should also be secured, a gentle laxative only being employed. A warm hip bath, followed by vigorous friction of the skin with a coarse towel, is beneficial. After the discharge has ceased, the injection should be continued for two or three weeks, to prevent a return of the trouble.

Another disorder often manifested by girls during puberty is **hysteria**, popularly known as "hysterics." In many cases there is undoubtedly a basis for this disease in some derangement of the sexual organs, but often hysteria is a purely mental disorder, the result of a lack of balance between the emotions and the will. The cases occurring during puberty usually are such; there is ordinarily no disease of the womb or ovaries, but merely a disturbance of the emotional nature; it is a result of the methods of education, mental and moral training, and peculiar social influences to which the girl is exposed. Hysterical women have usually been irritable, capricious and over-indulged children; and a hysterical "fit" is often to be regarded merely as the woman's way of expressing feelings which children and men express in angry words, boisterous behavior and sulkiness. This is so generally understood that people do not usually bestow upon hysterical females the same amount of sympathy and solicitude which would seem to be demanded by the violence and seemingly dangerous character of the fits; the hysterical convulsion is merely an evidence of bad temper, expressed in a way to obtain attention and sympathy which could not be secured by the temper without the fit. While such is doubtless the right explanation of many hysterical convulsions, not all cases belong in this same category; for often times it is certain that there is no intention to deceive or to abuse our confidence by exciting our sympathies by deception. Instances have been known—though they are rare—in which a woman has had a hysterical convulsion when alone; and nervous women often exhibit the same appearances under the influence of sudden and uncontrollable but genuine emotions.

The conduct of a woman during a hysterical attack varies extremely. At times there is merely an excess of an emotion which is, under the circumstances, perfectly natural and legitimate, such as tears or laughter. At other times there occurs a rapid and sudden change from laughter to tears, and vice versa. There may be con-

vulsive movements of the body and limbs, accompanied with screams. In the fully developed hysterics there are certain characteristic features; they usually occur during depression of spirits or bodily discomfort, especially at or near the menstrual period. The patient often has headache, perhaps cramps and numbness in the limbs, sometimes a feeling like that of a ball rolling around in the abdomen and chest, which rises into the throat, causing a feeling of choking. The breathing usually is hurried and irregular, there is palpitation of the heart and pronounced flushing, alternating with pallor, of the face. The patient usually falls, screams, pulls her hair, and performs a variety of bodily contortions; the arms are thrown aimlessly about, the knees are drawn violently up to the abdomen and as violently extended; occasionally nausea and vomiting occur. The general appearance of the patient, the disheveled hair, staring eyes, writhings, interference with circulation and respiration, form a startling picture, well calculated to distress and alarm the uninitiated, especially those who have a personal and affectionate interest in the patient's welfare; yet there is not the slightest danger, and the complete recovery of the patient is merely a matter of time—a few minutes or perhaps several hours.

Causes.—The chief causes of hysteria have already been indicated. In some cases, especially in married women, there will be found a diseased condition either of the womb or of the ovaries, the relief of which will be followed by a cure of the hysteria. Yet in the majority of cases, especially those which occur during puberty, the fault lies, not with the sexual organs, but in the moral and emotional nature; sometimes its development can be traced to extreme emotional excitement—fear, anger, disappointment in love, religious fervor. Since maternity is the natural climax of a woman's life, hysteria is especially prevalent among those whose sexual and maternal feelings find no natural gratification, and who at the same time have no object in life which may divert their attention. It is an interesting fact, having practical importance in the training of girls, that hysteria is very "catching." A case of hysterics is almost invariably followed by the same trouble in others who are intimately associated with the first victim; and this is especially true of girls during puberty. Boarding-schools and colleges for girls are sometimes swept by hysteria as by an epidemic, and comparatively few of the pupils between thirteen and eighteen years entirely escape this affliction. It is in such cases—which are merely examples of the strong tendency of the human mind to mimicry—that the purely emotional nature of hysteria is evident; for in these instances the disease can be usually entirely cured by simply stimulating the girl's will to control her

emotions. Sometimes a rather harsh stimulus is especially effective. A French physician who was called to one of the Parisian convents, where most of the young lady pupils had recently been hysterical, heated a number of irons red-hot before their eyes and with a bland smile informed them that the first girl who had hysterics would be cauterized down the spine. He did not require to use his irons.

If a case of hysteria does not yield readily to social and moral influences brought to bear in the home circle, it should be brought to the notice of the physician; there are no rules to be laid down as to medicine.

Responsibilities of Marriage.

"I am old-fashioned enough to believe that the chief end of woman is to be married, to have a home of her own, and to give birth to healthy children; and that woman, as woman, has no moral right to do anything that will unfit her for this end. Whatever does damage to her, does damage to those borne to her; and her disabilities are their disabilities—disabilities far-reaching and never-ending. A woman has undoubtedly the right to remain single all her life; but as a late writer forcibly observes, if she considers herself a candidate for love and marriage she has no moral right to touch any employment that will in any degree unfit her for domestic life and all the responsibilities that go with marriage. Now, while in the abstract this is undoubtedly true, yet I fear that it could be carried out only in the new Atlantis, or in some other equally ideal community. But while a physician cannot undertake to create a fancy republic where hygeia shall reign supreme and where every rule of good health and of good morals shall be observed, he can work efficiently toward the redemption of woman. He can discourage women from taking those industrial employments which tend to impair their health and to unfit them for the duties and functions of woman. Of this class are all those occupations which oblige the worker to be on her feet, and especially during her monthly periods. Should a dire necessity drive them to such work, he can so influence public opinion as to compel their employers to give them the daily or the monthly rest which they may need.

"Nor can women as a class keep up, without injury, the same amount of brain work as men. Where can a robust school-mistress be found? And how rare it is for a highly intellectual woman to be a healthy one! Then again, compare the health of the boys with that of the girls at our public schools. Women, from their own sensations and feelings, call themselves 'unwell' during the monthly flow. They

are, by their own showing, literally unwell, and are, therefore, at that time, as unfit for severe brain work as for fatiguing body work. The curriculum of studies in our female schools should, therefore, be lengthened out and graded to the physical needs of our girls—our nascent women. Out of school hours there should be very little study; while unwell their brains should not be overtaxed and their bodies overworked. Mothers should be taught how to preside over the physical education of their daughters—how to pilot their frail bodies safely through the shoals and quicksands of girlhood. The clothing should be thick and warm, and supported, not from the waist, but by the shoulders; their shoes stout and roomy; their chests unconfined by corsets; their brains not overtaxed. Candies, doughnuts and hot biscuits must be struck out from their path; such trash has made our dentists world-renowned. Habits of regularity in sleep, as well as in the evacuations, should be scrupulously enforced. Over-work in a constrained position, especially that at the sewing machine, must be forbidden. Let them daily take sunshine and exercise in the open air. But, on the other hand, let them, during their monthly sickness, avoid picnics, sleighrides, dancing parties, and other like imprudences.

Marriage

THE MARRIED STATE IS CONDUCTIVE TO HEALTH AND PROLONGATION OF LIFE.

Marriage.—Various observations go to prove that the married state is conducive both to health and to prolongation of life; thus, married women at the age of twenty-five have, on the average, thirty-six years of life before them; while unmarried women of the same age have not, on the average, more than between thirty and thirty-one years. In men, the mortality between the ages of thirty and forty-five is, on the average, 18 per cent in the married, but 27 per cent, or one-third more, in the unmarried; and, further, at the age of seventy, while there remain alive but eleven bachelors out of every hundred, twenty-seven married men out of the same number may be expected to reach the three-score and ten.

It has also been shown from statistics that suicide is very much more frequent among the unmarried. On the score, therefore, of physical and mental health, independent of other considerations, marriage is advisable; of course, its advisability in individual cases must rest on the relative position of the parties. Certainly, however favorable other matters may be, it is a great evil for parties to marry too early in life; the woman especially, if she commences child-bearing

early, that is, before the age of two or three-and-twenty, is liable to suffer in her constitution, and almost necessarily to transmit this debility to her offspring. In the case of those who have family when advanced in life, the trial is less to their own constitutions, but should the father be aged, the children are not likely to be strong.

As regards physical and mental development, it is an undoubted fact that the mixture of races, or at least of families totally unconnected with each other, tends greatly to elevate the standard of both. It has been remarked by Humboldt and others, that in South America the progeny of the negro and of the native Indian are greatly superior to the parents on either side; and it is well known that the Anglo-Saxon attributes the position of his race in the vanguard of progress to the mixture of blood which has taken place, as a necessary consequence of the successive occupation of Great Britain by different races.

What Marriage Implies.

Marriage implies, as its natural result, the production of offspring; and a due regard for the welfare of such possible and probable offspring should be carefully taken into consideration. It is evident that marriage can be complete only when the parties to the contract are physically competent to fulfill the sexual relations, and when the woman is capable of maternity. Now, while the girl is frequently capable, even in the earlier years of puberty, of becoming a mother, yet it is a fact patent even to the unprofessional mind, and well established by medical observation, that the girl is **physically unfit** for maternity. The disastrous results of premature motherhood are often seen, not alone on the youthful mother as physical injuries, but are also in the puny bodies and limited intellect of her offspring. The girl, in other words, is not made a woman by her first menstruation, for in the years to follow there must occur not only the development of her sexual organs, but also the increase in size and change of form of her whole frame, particularly the lower part of the trunk—the **pelvis**—whereby the germ of a new life may be fitly and fully developed within her body, and at the proper time permitted to pass through the pelvis to the outer world. For the too youthful wife marriage often proves a pain, not a pleasure; a grief, and not a joy. The imperfectly developed womb and ovaries, which might have attained perfection if left unmolested, but are unable to meet the demands of matrimony, are goaded into a state of irritation and disease. Her nervous system is often thereby enfeebled, and general prostration, as well as those diseases peculiar to women, may result. If she become a mother there is more risk of injury during and subsequent to her confinement; and, as she has to nourish her infant as well as her

own still growing body, it is not surprising that she often breaks down entirely. In our latitude and climate women usually continue to grow and develop up to the age of twenty years, though there are, of course, numerous exceptions in which maternity occurs earlier as well as later than this.

EUGENICS

Certain Mental and Physical Characteristics Obstacles to Marriage.

In the choice of a husband no advice can influence the dictates of a woman's heart; but it is the duty of the parents to suggest ordinary discretion and previous acquaintance with the mental and moral, as well as the physical, characteristics of the suitor. Certain physical characteristics ought, however, in the interest of the girl herself, and especially of her probable offspring, to constitute insuperable obstacles to matrimony. A man and a woman presenting the same hereditary taints, suffering from the same constitutional disease, or tendency to disease, should not, as they value their own happiness and that of their possible children, marry. This is particularly true in regard to consumption and insanity. Were our laws made with the same rigid regard for physical health as prevailed in ancient times, we would doubtless forbid marriage by all suffering or likely to suffer from consumption; and while we are in these days more humane, and take into consideration, in the estimation of conjugal happiness, the mental and moral as well as the physical welfare of the participants, yet we must remember that consumption is a hereditary disease, and that the child's chances of becoming a victim to it are greater if both parents be of tainted stock than if one be healthy. The same applies to insanity, epilepsy and other diseases of the nervous system; children may escape if the tainted be mixed with healthy blood, yet the most numerous and aggravated cases of obstinate nervous diseases occur in families where both parents have a tendency to the disease. In this general fact, too, is the solution of that much discussed question, whether relatives, particularly cousins, should be allowed to marry. The simple fact of relationship—when not nearer than that indicated—constitutes no physical impediment to marriage, yet there usually exists in these cases a physical objection; for the physical imperfection—hereditary taints and tendencies to disease—if any exist, will probably be found in both members of the family, and these defects

and taints would in all probability be transmitted to and aggravated in their children; and while there is no physical objection to the inter-marriage of cousins, provided both be healthy, yet there will usually be a family tendency, the aggravation of which by inter-marriage would be disastrous to happiness. Close and repeated inter-marriage among relatives is, from the physical point of view, undesirable. It is a law, true of man as of other animals, that the most vigorous qualities of a given stock are best maintained by admixture of foreign blood; and it is a fact that marriages between Americans—those whose ancestors have lived in this country for several generations—are less productive in number of children than marriages between a native American and a European.

Selecting the Time for Marriage.

In selecting the **time** for marriage, certain facts should not be lost sight of amid social considerations. The health of the wife and of her possible offspring is best guarded by marriage in the spring or in the fall; for entrance upon this new life is beset with physical and mental trials, which are all the more trying amid the extremes of summer or of winter. One important consideration gives spring an advantage over autumn: if a child be born within a year its chances will be far better for surviving the critical period of teething, since the most trying part of this process will then occur in cool weather, and not in the heat of summer. The wedding should take place about the middle of the interval between two menstrual periods.

It is the custom for the newly married pair to start at once upon a wedding tour, yet it is generally understood that this tour need not be extended. Indeed, it is a hopeful sign, that the wedding tour is no longer so imperatively required by society as formerly. From the physical point of view, certainly nothing could be more objectionable than a long journey right after the marriage ceremony. When, in addition to the annoyances inseparable from traveling, the bride has to undergo the trials incident to initiation into her new life, it is easily apparent that the girl is, during the ordinary bridal trip, subjected to a severe and in large part unnecessary physical strain, and at a time most critical and important for the security of the future happiness of herself as well as of her husband. They are, it is true, withdrawn to a certain extent from the rude realities of life into an atmosphere of affection and sentiment; yet it must be remembered that this affection and sentiment, however sincere and hearty, has a physical basis—a foundation which would be better and more securely laid if both, especially the bride, were relieved from all unnecessary fatigue and annoy-

ance, for at this time she has supreme need of physical perfection and at the same time of the greatest tact and discretion. Sometimes, too, she must be prepared for disappointment, for probably every man, however sensible and rational in other matters, is positively silly during the courtship and engagement; invests his fiancée with perfections of body and mind which are actually never found in mortal shape; in fact he marries an ideal creature of his own imagination, and during the first week of married life he has to substitute the actual for the ideal. Hence it often happens that a certain change of feeling is felt by many men, who nevertheless have sincere affection for their wives—an alteration of feeling for which the bride is not responsible, and yet which she must anticipate and be prepared to meet.

INSTRUCTION THIRTY-FIVE—*Secrets of Nature*

A Tactful and Delicate Way

**To Tell Children About Child-Birth and the
Beautiful Mysteries of Life.**

How and when to tell children about birth is a serious problem to all thinking parents. Few parents make clear to their children how honorable, happy and acceptable to all right-minded people is the passing on of life from generation to generation. Every well-mated parent knows that the life-giving power is the most wonderful, mysterious and poetic of man's possessions, yet it is left to children to learn about it in a jumbled, unnatural way. Many ugly mistakes in the lives of children will be avoided when we have learned to break through our timidity and to bring the child to a proper degree of knowledge of the beautiful truth about this matter. The difficulty is in making a beginning. Once this is rightly made all the rest will easily follow. The child's age, character and circumstances must be taken into consideration, and pains taken not to arouse more of roving curiosity than we avert and not to exaggerate the subject out of its proper proportion among all the child's various present interests. The account given below of the actual way in which some parents have solved the difficulty of making the beginning will serve to show the way to many who have long felt the need of doing it but knew not how or when it should be done. Many parents tell their children fanciful untruths to evade questions which are very natural and which sooner or later must be answered more or less truthfully from some source, unfortunately too often from a wrong one. The stories that

the baby comes with the doctor, grows under a cabbage, was left on the doorstep, brought by a stork, dropped out of the sky and various others, are familiar to all grown-ups, but their only effect is to make children feel that there is something about it all which their parents are ashamed of and wish to keep a secret from them.

Children are usually poetical in their natures and many matters of fact are easily conveyed to them by truthful poetical expressions which do not contradict facts but really interpret them. Thus a wise mother may insure a right feeling in the child's mind by beginning with symbols or saying that an angel brings the baby from God, or that it comes from the "Everywhere," as so beautifully described in George MacDonald's little poem with that title. This is suited to a child of two or three years. But for an observant child of six or seven symbols are no longer adequate nor truthful in answer to his very practical questions, and he must now be given material fact instead of fancy. One father and mother wisely chose the natural situation of the coming of another little one, and about a month before the expected event the father told his boy of seven about the mystery of life. All the manliness of the little fellow was aroused; he threw his arms about his mother's neck and from that time on was very solicitous about her comfort. He would see that she had an easy chair and bring her a pillow for her back. After his little brother was born some of his companions were trying to explain in their own way where babies come from, but he silenced them by saying: "My father told me all about that."

Another mother, realizing the importance of first impressions and wishing her children to learn that the birth of a child is a pure and sacred thing, used a scientific side of the subject to present it. Her boys, Jack and Tom, were seven and nine years old, and it was more and more difficult to shield them from the vulgar talk of older boys. Each boy was given a plot in the flower garden, which he planted with numerous seeds. Presently, when the seeds had germinated, the boys were encouraged to investigate the development of the young plants and to dig up a seed or two each day to watch the progress. When a new baby arrived next door one day, the two boys' mother heard them discussing whether the doctor or a stork had brought it, and she saw the opportunity to tell them the truth. She recalled to them how they had planted the seeds in the bosom of Mother Earth, and how they had there been kept warm and nourished until a little plant had formed; then when it was strong enough it came out into the open air and grew into a large plant. "And it is just so about the baby," she said; "a little soul-seed is planted in the mother's breast, where she

loves it and keeps it warm until it grows into a baby strong enough to come into the world though still very helpless. Children are their mothers' beautiful flowers." "And did we grow from little soul-seeds," asked one boy, "tiny little seeds like our lettuce seeds, mother?" "Yes, my dear." "Does Bobby know about soul seeds?" "Oh, you must let Bobby's mother tell him. Boys should talk only to their own mother or father about those things; it is not nice to discuss private matters outside the family."

Another mother, with two girls and a boy, told her children, as soon as they could understand, that when the life spark makes a little child begin to grow, the mother carries it in its tender shell within her so as to protect all its delicate parts. Later, as they study flowers, she tells them that the life spark is given by the father, much the same as pollen is given by the stamens to the pistil.

One mother living on a farm (and there is no happier or better place for childhood) was asked by her six-year-old boy: "Where did the new little pigs come from, mother?" She answered: "Out of the 'Everywhere' to the mother pig." "But," said he, "how did they come? Did they come down like snow?" Then the mother knew that the time had come when he should be told, and she replied: "No, not that way. How do you think they come?" "Why, I don't know," said the child; "and how does the pig know that they are meant for her and not for one of the others?" "Well," said his mother, "you know what an egg is, and that the hen has it inside her until she lays it. Then she sits on it for a long time and keeps it warm, till at last the little chicken has grown big enough and strong enough to come out. You know that chickens and ducklings and all baby birds come out of eggs, but you didn't guess that kittens and puppies and piggies and lambs and all baby animals and all plants come out of eggs, too. But they do. Seeds are plant eggs. But you never see cows' eggs, for they do not lay their eggs until they are hatched and the calves are ready to run about. If the cow laid her egg sooner she could not keep it warm. She is so rough and so heavy that she would break it, and besides she has to go about and eat a great deal. So she keeps it inside where it cannot get hurt, until the calf is all grown, just as a chicken is. Then she lays the egg and the calf comes right out or is hatched at once." "And do children grow in eggs, too?" asked the boy. "Yes, just like calves and piggies." "But," said he, "our hired man says the doctor brings the baby." "Well, Steve doesn't know much about such things," she answered. "The doctor comes to see that the new baby is all right and that the mother gets rested."

How One Mother Told Her Boys About the Mystery of Birth

"My boys were five and six," says a mother, "when I told them about birth, though, of course, not about generation. I told them that flowers have seeds; that birds, insects, fish and frogs have eggs, but that four-footed animals and human beings have babies. I explained that seeds are made in a secure place in the flower, and later are kept warm and hidden in the ground, where they are fed and grow into little plants; that eggs are made inside the bird in a safe place, and are covered with a strong shell before being laid, after which they are kept in a warm nest until the little bird has formed and got ready to come out; while babies of whatever sort are made in the safe part of mothers, where they are carefully kept until they are all ready. For a week after telling them, the boys seemed to think about it all the time, talking about it between themselves and often asking questions. I did not let them play with other children while this lasted, and I told the mothers of their special friends what I had said to my boys, so that those mothers might be prepared for anything their own children might say later. In about a week the new knowledge had settled into its place among other interesting bits of information and there were no protests from the other mothers. After this kind of beginning my boys came naturally to a fuller interest and sense of responsibility about the work and care of their own bodies. They are deeply concerned about life and health, but have very little instruction about sickness.

How a Father Explained Child-Birth to His Boy.

A father who now has six children solved the problem thus: "Our first child, a boy of seven, to our great regret had no brother or sister. But one day I called him to me and said I had a lovely secret to tell him. So he shut the door carefully and climbed on my knee, and in the kindest way and in a low tone, but not whispering, I said: 'There is a baby coming for us. It is being made for us now. Mother is making it and it is a very difficult thing to do. It is very delicate work to make a baby, and there are so many wonderful parts about it that while she is making it mother has to keep it very safe from all harm. So she keeps it within herself, in her own body. She does not make it with her own hands, you see, but makes it just as she makes her own body—by growing. And the baby grows very slowly and takes a long time, and all the time it is hard for dear mother and makes her very tired. But she loves the baby and you and me, and wants to have another little child in our family. She does not mind

being tired from helping it grow, but you and I must help her all we can so that she will not get too tired. We must do things for her and show her how glad we are. She is doing this hard thing because she loves us. Now, it's a secret, just like things for Christmas, and most people do not know about it, and we won't tell them until baby is all ready to show them.' He was delighted, kept the secret well, never speaking of it above a whisper, and always watched for ways to help his mother. Gradually, as he became exposed to low talk from older boys, I told him the true and pure meaning of what they said, and advised him not to argue about such things with boys whom he didn't know well, but if he could not turn the talk to something else, simply to walk away. I never had any difficulty about his keeping himself in good condition and never using any part of his body in mean or harmful ways. Later he was "the cleanest fellow in school" and always respected and popular among his college mates."

A mother of five girls (the eldest just married and the youngest just finishing school) always took pains to make sure that each of her girls learned from her, some time between five and eight years of age, that babies grow and are nurtured within their mothers until they are strong enough to live outside and be cared for in the open air. The exact age at which the child was told depended upon circumstances, especially upon the nature of the particular child, but it was never later than eight. Each was told in a different way, according to circumstances and opportunity. One already knew from her older sister. None of them were either surprised or troubled, nor became curious about details. One was matter of fact; one was reserved and awed and thought dimly of what it meant in her own future and in her own past; another was filled with tenderness and thought of her mother in a new way; and the other one was almost amused. All additional kindred knowledge came to these girls so naturally after this beginning that their mother did not remark any special incident, but she and her daughters always held the matter and all concerning it as private, important and sacred, though all learned that some people think the subject funny, others regard it as disgraceful and many try to ignore and forget it. Yet these girls felt there was so much beauty and satisfaction in their own knowledge and attitude on the matter that they were not attracted by those other people's ideas.

The above instances are enough to show that in the thoughts of such children, close companions and confidants of their parents, birth seems, as indeed it is, a fitting entrance into this world where everything springs from something, has its source and cause, and where all things, both visible and invisible, blend together in harmony.

DISEASES OF WOMEN

WHAT EVERY WOMAN SHOULD KNOW

Concerning Primarily and Chiefly the
Organs of the Reproductive System.

DISEASES OF THE OVARY.

Subject Reference

*For Childbirth
and the Expectant
Mother, see pages
247-265.*

*For Marriage
and Sex-Life, see
pages 266-306.*

When the ovaries are removed, the nutritive system may possibly still attain a normal development, but the nervous system does not—it remains upon a lower plane; usually a mental weakness, and often derangement of mind, occurs among those in whom the ovaries are imperfectly developed.

In an insane asylum, where a number of cases were especially examined, it was found that quite a number had imperfectly developed sexual organs, many had never menstruated at all, and others had done so imperfectly, showing that in many cases, where a defective development of the ovaries exists, it undoubtedly is an important element in causing insanity. Again, the mental derangement appeared in the majority of them at or about puberty.

Inflammation of the Ovaries.—In many cases there may be only congestion, most frequently found among those who are unmarried or among young widows, who have never borne children. It does not come on suddenly, but is developed rather gradually, and those most liable are the nervous and emotional who live in conditions of life favoring excitation without complete functional action of the sexual organs. It rarely or never occurs in those who live under wholesome conditions of life, or who were married, bearing and nursing children, and who live quiet, rational lives. At the beginning there are pain and heaviness in the region of the ovary, usually accompanied by nervous disturbance, the patient being irritable and weak, easily excited and easily fatigued. Shortly after these symptoms develop the menstrual function is deranged, excessive flowing and preceded by pain in the ovaries. There is also pain in the back and a general bearing down in the lower part of the body, increased by walking or standing.

The cause of congestion of the ovaries is chiefly due to over-stimulation of the emotions in those of a nervous temperament. Stimulating tonics, which create an appetite which is not satisfied with food, will cause gastric congestion, so in the same manner stimulating the sexual appetite of unoccupied emotional girls by evil influence or improper associations leads to ovarian congestion. Indulgence beyond normal gratification is also said to produce the same result. Then, again, it may be secondary to inflammation of the womb, sedentary habits and constipation, which may obstruct the free circulation in the pelvis; but such cases are exceedingly rare. The treatment is to remove the cause, a change from books and society to the country and outdoor life. In younger patients, direct their attention to something other than self and the feelings and emotions. Complete recovery has frequently followed the termination of an engagement in marriage in older patients. Bathing, either sea bathing or shower-baths, when the patient is strong enough to bear it; tonics (*nux vomica* being the best), and bromides when the patient is very nervous, are the chief remedies.

Acute inflammation of the ovary (ovaritis) is quite distinct from the other ovarian affections, as it is usually the result of a special infection, such as gonorrheal, puerperal, septicemia or blood poisoning, or some condition like that which exists in certain fevers and in acute rheumatism. It may also be due to an injury, though that is somewhat rare except in a general inflammation due to an injury.

The acute affection runs a very rapid course and terminates either in death or with the inflammation subsiding and leaving a damaged state of the ovaries. In chronic ovaritis there are changes which take place more slowly and are not marked by the same definite products of inflammation.

Symptoms.—There may be a chill, followed by fever, nausea, vomiting and more or less pain. The patient is irritable and anxious, but never delirious; sometimes, however, hysterical. Death may occur from septicemia, especially where there are a number of small abscesses with thin walls. If the pus is discharged through the rectum or vagina, or with the abscess encysted, recovery may take place; but where the abscess opens into the abdominal cavity death usually occurs. In many cases where the patient has suffered from chronic ovaritis and numerous remedies have failed in giving relief, prompt results are given by surgical treatment. Their removal is not, however, free from all danger, and does not in all cases give complete relief. Younger subjects do not bear the loss of their ovaries well. Some grow fat, indolent, inefficient and suffer much from headaches; others are irritable, dyspeptic and despondent, while but few enjoy good general health and mental vigor. The objections to surgical treatment apply to those where both ovaries are diseased. In cases where only one is affected, its removal gives relief and this line of treatment is perfectly satisfactory. General treatment should be directed to the digestive organs; the poor appetite, coated tongue, constipation, or irregular appetite, flatulence and occasionally diarrhea, can be relieved by small doses of calomel, followed by a laxative, such as a Seidlitz powder, Apenta water or something of that nature. Direct or local treatment should be adapted to state of the patient. In the unmarried, however, local treatment is frequently injurious. Hot Sitz-baths, counter-irritation, such as the applying of a mustard plaster or painting over the part with tincture iodine, hot vaginal douches. In weak and nervous patients the wet-pack may be used for half an hour at a time. Married women are more benefited by the local treatment than anything else, and should be kept in bed until the pain subsides. Tonics and laxatives should be given, and, where there is insomnia, Sulphonal in fifteen-grain doses, or ten grains of salicylate of sodium and five grains of antipyrine, three times a day, an hour before meals. Patience and careful watching are important factors in successful treatment. The poor in hospitals often suffer for want of time for prolonged treatment, and so the surgeon is frequently tempted to give more prompt relief by removal of the ovaries.

Tumors of the Ovary.—The majority of these patients suffer from some pain and discomfort, and at the same time there is more or less derangement of the function of the ovaries, and occasionally some disturbance of neighboring organs; but many are unconscious of anything being wrong until the tumor becomes noticeable by the size of the abdomen. The symptoms differ in different stages and may be divided into three divisions. First, those where the tumor still occupies the pelvic cavity, there is simply a feeling of fullness in the pelvis and possibly some straining when walking or standing; pain is also present in the affected side, and may not be acute enough to prevent the woman from doing her ordinary

duties, while in others it may be quite severe and with well-defined tenderness, rendering the patient disabled to some extent, when there is usually more or less inflammation. Menstruation is usually disordered, but not always. Irregularity or suppression of the menses is the most common derangement; occasionally it is profuse and too frequent, but either of these may be due to some constitutional condition. When the tumor is of a considerable size and still does not rise out of the pelvis it may cause displacement of the womb or bladder. When the left ovary is the one affected, it may cause some obstruction to the rectum and movements of the bowels.

An important fact in regard to the first stage of tumors of the ovary is that the symptoms are often so mild that the patient may not suffer any inconvenience from it, and hence it never be noticed, either by herself or her doctor.

In the second stage, an enlargement of the abdomen is noticed which is usually central, but may be in either side; there may be no other well-marked symptoms. As the tumor increases the weight and pressure cause discomfort, which is felt earlier in those who have borne children than those who have not, the abdominal muscles in the latter not yielding so readily. Slight pains recurring at intervals and tenderness are common symptoms. If inflammation of the tumor takes place there are also constitutional symptoms, such as fever, rigors and, if extensive, the digestion becomes deranged and a loss in flesh. Ordinarily, these are about all the general symptoms in the second stage.

Third stage develops another class of symptoms: Deranged digestion, impaired urination, difficult breathing, distressing weight in the abdomen and a dragging in the abdominal muscles, together with pain and tenderness in a marked degree. Pressure on the bladder will cause frequent micturition and the bowels may become obstinately constipated. Paroxysms of pain in the limbs and abdomen may be very severe, owing to interference with the circulation. The patient becomes emaciated, weak, and has a flush in the cheek.

Sometimes pregnancy has been mistaken for a tumor in the abdomen, and when there is any doubt it is better to wait until the nine months' period has elapsed before submitting to any radical treatment.

Pregnancy outside the womb, which sometimes takes place, has been mistaken for a tumor, but the signs of a living child in the abdomen should promptly clear this point.

Distended bladder has also been mistaken for a tumor in the ovary, but usually the urine dribbles away or comes in spurts when the patient moves.

Impaction of feces is one of the conditions that may be mistaken for a tumor, but it is hardly possible to make this error.

Treatment should be left to the judgment of the surgeon or attending physician.

Menstruation.—This is a function of the womb, but is governed by climate, personal peculiarities and conditions of life. There are, however, certain rules which apply to menstruation with great uniformity:

1. Menstruation should begin when the woman is maturely developed, no matter what the age may be. All the organs of the body should be completely developed, so far as form and structure are concerned, before the function of menstruation appears.

2. It should recur at regular intervals, about once every twenty-eight days, but the duration may vary with different people.

3. The discharge should always be fluid in consistence and of the color of blood.

4. The flow should continue a definite length of time (3 to 5 days), the duration depending upon the habit of each case.

5. The quantity should be about the same each time.

There should be no variation from the first rule, and whatever habit is established at puberty, that habit is normally maintained through life. In cases where there is no uterus or marked defects, the menses never appear. In such cases nothing can be done.

Mothers should inform their daughters of the meaning of menstruation (also termed "the monthly," or "the monthly period"). It is important to avoid fatigue or excitement of any kind, and especially exposure to cold or danger during the period. Rest in bed is often advisable.

Amenorrhea.—As a general rule, any constitutional affection which impairs nutrition and reduces strength very decidedly (especially when it continues for any length of time), will affect menstruation. This is well illustrated in phthisis: in the advanced stages the menses usually stop, simply because the general system is unable to sustain it. In acute diseases, such as pneumonia, typhoid fever, menstruation may be interrupted for a period or two, but it usually reappears when the patient fully recovers from the constitutional disease. Again, in organic diseases of the liver, lungs, heart or kidneys the menses may stop or become scanty and irregular. Severe shocks, exposure to cold, fear, fright and extreme mental work may cause the menses to temporarily cease.

Dysmenorrhea (painful menstruation).—Menstruation from the first may be painful, in many cases due to a **flexion** (or bending) of the womb. The greater the deformity the more marked the pain, which always precedes the flow and is intermittent in character. Where the flow begins the pain either subsides or becomes much less. It resembles the pain in abortion in the early months of pregnancy.

Painful menstruation often occurs without flexion, but in such cases the pain continues through the whole period and is not relieved by dilating the mouth of the womb.

Where painful menstruation is due to flexion all the symptoms usually are increased by marriage, and if pregnancy occurs very likely miscarriage during the early months results, but the effects of the pregnancy tends to remove the deformity, so that the woman will likely become pregnant again and go on to full time, the deformity thus being cured completely.

Checking the menses (as by exposure to cold), or any cause which will cause excess of blood to the parts, as occurs in endometritis (inflammation of the lining of the womb), increases the pain and gives rise to new symptoms. Leucorrhea (or "whites"), backache, deranged digestion and nervous disturbances, are all added.

In the intervals between her periods the patient in her early life is free from trouble, but eventually develops symptoms of womb and vaginal trouble, and in time becomes a broken-down, miserable patient, frequently seeking relief in stimulants and opium, which only soothe for a time.

The Treatment.—Medicinal treatment is only palliative (gives temporary relief). The surgical treatment is simple and effective when entrusted to a competent doctor.

Diseases of the Fallopian Tubes.—Inflammation or disease germs within the womb may extend into the Fallopian tubes because these open directly into the womb. An abscess on one or on each side may result, and is known as a “pus tube.” The infection may traverse the length of the Fallopian tube and set up peritonitis. This is, in such cases, generally limited to the pelvis or lower part of the abdomen. There is intense pain, tenderness on pressure, fever, headache, constipation and sometimes vomiting. The treatment consists in opening the bowels, light diet, absolute quiet in bed until well, hot applications (fomentation, or poultices, as hot as can be borne) to the abdomen, and especially having a physician early. Only a doctor can tell whether it is peritonitis, appendicitis or some other inflammation which is present.

Extrauterine, or Tubal Pregnancy.—In this the embryo is situated outside the womb, either in the Fallopian tube or in the peritoneal cavity. Usually a considerable period of sterility precedes such an occurrence.

Symptoms.—1. The signs of pregnancy are usually present, the menses stop or the patient has peculiar hemorrhages; nausea and vomiting are noted. Some of the early breast signs are found and pelvic discomfort very marked.

2. Hemorrhages from the womb occur usually in gushes and often suggest a miscarriage.

3. Shreds are usually passed.

4. The patient suffers from paroxysms of pain which are abrupt, very violent, cramp-like, and in the more acute paroxysms are attended with collapse and signs of internal hemorrhage.

When the rupture opens into the abdominal cavity the symptoms are extremely grave. The pain is agonizing, the surface of the body becomes cold and clammy, the pulse feeble and rapid, temperature below normal, with nausea and distention of the bowels from gas, with great shock, which gradually becomes more profound as the hemorrhage continues. If relief is not given the patient dies from shock. Should the bleeding cease the patient rallies and the symptoms of shock are gradually replaced by peritonitis, which, if not fatal, is followed by septicemia, or blood poisoning, or, more rarely, recovery may follow.

Treatment.—Electricity or operation by a competent surgeon as soon as the diagnosis is made. It is an **exceedingly dangerous** condition at any stage, but when operation is done in the early months very excellent results are obtained. When neglected both mother and child usually die. Should operative treatment be deferred and the case go on to full time and then the child be delivered by operation it usually dies within a few weeks.

Womb—in medical language, the uterus. This most important organ is, in its ordinary condition, situated in the cavity of the pelvis, but when distended, as in pregnancy, it rises into the cavity of the abdomen. Somewhat triangular in form, it is covered by the general lining membrane of the abdomen and pelvis, the peritoneum, and is held in its place by various ligaments. The affections of the womb may be considered as those which are connected with the state of pregnancy (see Pregnancy), and those which are not. In the latter case it is liable, though rarely, to be the seat of inflammation, the affection being characterized by the usual symptoms of inflammation, local and constitutional, and requiring the same management as inflammatory affection—peritonitis—of the bowels generally. Congestion of blood, enlargements, tumor, and polypus—disease of its neck, including cancer, etc.—are among the affections to which the womb is

liable. It is also liable to displacements, dislocations, as it were, from before backwards, or the reverse; and likewise to coming or "falling" down, or, as it is called, "prolapsus." The latter occurrence is the most usual after the time of child-bearing is past, in women who have borne large families, and especially in those who have neglected themselves after confinement, by getting up too soon: it is therefore a frequent complaint among the lower orders, who are in a measure forced to neglect themselves under the circumstances. The falling, or prolapsus, of the womb is permitted by general laxity of the parts, but especially of the ligaments which ought to retain the organ in place: it is further aggravated by the congested and enlarged state of the organ which thence results. Such a state of matters cannot be too soon rectified, and by all means ought to be placed under the management of a medical man, who will recommend an operation or one of the various instruments for such cases, as may appear most suitable. In the meanwhile, rest in the horizontal posture, and general soothing treatment, are the best palliatives. The other displacements of the womb, backwards or forwards, are more usual in its enlarged condition; in pregnancy especially, the former is often the result of permitting the bladder to become unduly distended, so that by its weight it presses the womb out of place, and into such a position that it cannot easily recover itself. In these, and indeed in all affections of this organ, the assistance of a medical man cannot be too soon procured; domestic treatment can do little or nothing for their permanent relief, although it may, if properly directed, palliate considerably the more urgent symptoms. The affections of the womb may of course develop with greater or less rapidity; some are sudden in their onset, and urgent in their symptoms; others arise almost imperceptibly, and go on slowly. In most cases, however, there is sense of uneasiness and dragging weight about the parts, perhaps actual pain of more or less severity; the functions of the bladder may be interfered with, and difficulty of micturition occasioned; or difficulty or pain be experienced in emptying the bowels. Under some circumstances, discharges of blood or matter may take place. The constitution may more or less sympathize, and irritable fever arise, or obstinate vomiting, or dyspepsia, with excessive nervous irritability and hysteria. Under circumstances, when symptoms like the above, or others suspected to be in connection with the womb, show themselves, an individual can scarcely err in assuming, if possible, entirely the horizontal posture; if there is much pain, and especially any symptoms of feverishness, fomentations to the lower bowels may be used; at the same time, the strictest attention must be paid to the due action of the bowels by means of castor oil, senna, etc., or in full habits by salines, perhaps preceded by moderate doses of blue pill, but all preparations containing aloes must be sedulously avoided. Injections of cold, tepid, or warm water simply, or rendered more aperient by the addition of medicines, are often useful. The diet must be regulated according to the habit and constitution of the patient; if this be full, a reduction, especially in stimulants may safely be made; but if the habit be moderate, the diet may be kept so, too. In the weakly and debilitated, it may require to be increased, especially if there is any drain, such as discharge of blood, etc., going on. The above are palliative measures, which may be safely resorted to under most circumstances; they are, however, palliative only; curative means can only be carried out by a medical man, under whose care all affections of this organ, so closely connected with female health, happiness, and well-being, should be placed without delay—with-

out waiting for serious symptoms to arise. Moreover, it should be remembered that there are states of impaired health, of a dyspeptic and nervous character especially, dependent on uterine derangement, which in itself gives no marked sign.

Breast.—The term, as here used, is applied to the female breast, devoted to the nourishment of offspring. The essential part of the breast is the “mammary” gland, which secretes the milk. This gland, along with the breast generally, becomes fully developed, and fitted for its functions, as womanhood advances; and at the same time, the nipple enlarges, if it is permitted to do so by the stays, which too often offer such impediment to its development as to entail much suffering when women come to be mothers. Too frequently, when the nipple ought to be fit for the suckling of the child, it is found so flattened into the breast that it is nearly impossible, sometimes quite so, to get it drawn out sufficiently; much suffering, and not unfrequently abscess in the breast, is the consequence.

Women are often morbidly sensitive respecting any ailment affecting the breast, and render themselves unnecessarily miserable if they detect anything unusual. Sympathetic pains are put down as the certain precursors of some dreaded disease; or the slightest hardness is observed and fingered, till it really becomes tender and inflamed, and in consequence enlarged. In such cases, if the patient is reasonable, and can be persuaded to give up the habitual interference with the part, the uneasy symptoms and suspected “lump” will often disappear together. Still, they may not do so, at least quickly, but that is no reason why the affection is necessarily a serious one; quite the best plan in these cases, is to **take professional advice without delay**; if the cause of alarm is unimportant, the mind is set at rest; should it be otherwise, its nature cannot be too soon detected. Above all things, tampering with such matters must be avoided; the rubbings, etc., too often employed, may irritate a slight swelling into rapid and painful increase, or something worse.

If the above advice is followed it is unnecessary to treat of that dreaded disease, cancer of the breast; a suspected case ought neither to be left to unprofessional opinion nor domestic treatment, and to give here the incipient symptoms which are many of them common to more harmless affections, might only tend to excite groundless fears.

Inflammation and Abscess.—The disease from which the female breast most frequently suffers is inflammation, followed by abscess. This may occur at any time, but most commonly it is within the first few weeks after child-birth. Generally within twenty-four hours after the birth of a child, the breasts become turgid, and slightly hot, from the increased flow of blood which goes to them to supply the secretion of milk; in this excited condition, and indeed during suckling generally, they are peculiarly liable to become inflamed; cold, any slight bruise, such as that from a bone in the stays, overdistention with milk, or even mental excitement, may, any of them, give rise to inflammation which ends in abscess. All these causes, and any others likely to injure, must therefore be most carefully avoided, and particularly the accumulation of milk; the breasts should be well emptied. If from flatness of the nipple, weakness of the child, or any other cause, the milk is not well drawn out, measures which will relieve must be adopted. Various forms of breast-pumps are used; or a wide-mouthed bottle, capable of holding a couple of quarts, may be employed, being first dipped into hot water to exhaust the air, and then applied to the breast, the suction exerted as it cools will

cause the milk to flow freely. Some nurses have the art of drawing the breasts with the mouth, more thoroughly than any instrument, and when such aid can be procured, it is right to make use of it. The first symptoms of threatened abscess, are pain and knotty hardness in the part; if the process goes on unchecked, there is much throbbing and a sensation of weight, the skin over the part affected becomes red, gradually thins, and at last gives way, allowing the escape of the matter, occasionally mixed with milk. Some amount of irritative fever accompanies the progress of the affection. After the discharge of the matter, the abscess may quickly heal, or it may remain open and running for a considerable time.

The first few hours of threatened mammary abscess are the most valuable; if it is to be prevented, it must be then. The breasts being well emptied, gentle friction, continued for ten minutes at a time, and repeated every four or five hours, must be most assiduously employed. A soft palm is indispensable for the process, and fresh olive or almond oil is the best for rendering the friction easy; the various applications, such as goose fat, etc., often recommended and used, are disagreeable, and not better than the simple oil, the mechanical friction being the active agent for good. During the intervals between the friction, the best application is lint soaked in tepid water, and covered with oiled silk. The bowels should be kept clear: ten grains of Plummer's pill may be given, and followed in four hours by castor oil, and from six to ten grains of carbonate of potash, with the same quantity of nitrate of potash, and five to twenty drops of tincture of aconite are to be given every five or six hours in a wineglassful of water. The diet must be light and cooling. Tepid moisture is better than much heat. It is of much importance to support the breast, and it is sometimes beneficial to exert pressure by strapping with plaster. When from the throbbing character of the pain, or from the tension and inflammation of the skin, there is reason to suspect that matter has formed, the treatment must be changed; hot fomentation and poultices are to be regularly applied, the distressing weight of the whole breast being relieved by slinging with a handkerchief around the neck. The bowels are to be kept open, not purged, the pain and restlessness relieved by an opiate at night, cooling drinks allowed, and the diet light but nourishing. In certain stages, and under certain conditions, it is the practice of medical men to open breast or milk abscess with the lancet; for the unprofessional the safest course is to permit it to discharge itself.

After the discharge of the abscess, a more nourishing diet is to be allowed, and wine or malt liquor may probably be required. If there is much debility, a wine-glassful of infusion of bark, with thirty minims of sal volatile, or a grain of quinine in a glass of sherry may be taken twice a day. If the system is relaxed, and tendency to perspiration exists, twenty minims of diluted nitric acid should be substituted for the sal volatile in the bark infusion. As long as mammary abscess is merely threatened, the child ought to be allowed to suck, but from the time of matter having formed, till its discharge, it must be kept from the affected breast.

Even when milk or breast abscess has considerably advanced, it may often be checked by the use of extract of belladonna tolerably thickly smeared over the swollen and inflamed part, the extract being, in the first place, softened by the addition of an eighth part of water. If the application is used near the nipple, care must be taken that it does not come near the infant's mouth—a piece of linen is of course placed over the breast.

If hardness remains after the breast is healed, friction may be used with soap

liniment, either simply, or with the addition of a drachm of compound tincture of iodine to each ounce.

The breasts of infants a few days after birth are liable to become distended with a thick milky-looking fluid, which some nurses barbarously squeeze out. This should never be practised; bathing with warm water, and the use of cold cream, or some simple ointment, is all that is requisite.

Youths, about puberty, occasionally suffer from a hard, slightly painful swelling around the nipple, which sometimes creates alarm. It is of no moment, and requires no treatment beyond warm fomentation, if painful.

PART FIVE—*Infectious Disease*

Medical Diseases

How Contagious Diseases May Be Transmitted.

Subject Reference

For Venereal Diseases under Sex-Hygiene and the Social Evil, see pages 237-246.

For Special Precautions regarding Infectious Disease, see pages 514-522.

Meaning of Endemic, Epidemic and Sporadic

Some People Naturally Immune. Great Difference in Susceptibility of Different People.

Four Different Ways That Disease Bacteria May Be Transmitted to the Human Body.

THE GERMS OF INFECTIOUS DISEASE.

INSTRUCTION THIRTY-SEVEN—*Introductory*

Climate and seasons favor or oppose the development of the germs of this class of diseases, or, the general health and resistance of people may be affected by these conditions. The causes of the infectious diseases are minute organisms, usually bacteria (belonging to the vegetable kingdom). These may be transmitted to the body (1) **directly** from sick persons or (2) **indirectly** by healthy individuals or animals (e. g., flies) or (3) by diseased animals (e. g., rats for plague, and mosquitoes for malaria), or finally (4) by food drinking water, dust, clothes or other articles, such as toys, books, etc. By **infection** is meant the conveyance of the virus of a disease in some indirect way, as through the various media of air, water, food or fomites, into the body, and without any surface lesion; by **contagion** is meant transference of the virus by **actual contact**, and also without any breach of surface; while **inoculation** always implies breach of surface (that is, a break in the skin or other surface), whatever be the mode of conveyance of the virus into the system.

The term **endemic** is applied to a disease when it is more or less restricted to a particular locality, and, owing to local causes, exhibits a tendency to linger or reappear in the district. The term **epidemic**, on the other hand, refers to a disease which breaks out suddenly and spreads widely; but some diseases, such as plague, cholera, and yel-

low fever come under both categories. Another term, **sporadic**, is applied to diseases such as enteric fever or diphtheria, which often crop up in isolated cases, and when it is not possible to trace them to previous cases.

The germs of an infectious disease occur in the blood, in the tissues (or flesh), in the body fluids or in the excreta or discharges (urine, feces, sputum, pus) of the patient, but are absent from healthy people or people ill of some different disease. The germ of any disease can usually be artificially grown or cultivated on suitable nutrient substances (so-called "media") such as beef broth, gelatine, potato, carrot, milk, etc. When a little of such a "culture" is injected under the skin of an animal (rabbit, guinea pig, rat, etc.) the special disease results in that animal and the germs appear in it in great numbers. In some cases by accident, lack of care or purposely, the disease has thus been reproduced in a human being. The greatest advances in our knowledge of disease in recent years has been made by such studies (bacteriology), notably by Robert Koch, in the case of tuberculosis, the germ of which he was the first to discover. In the case of most infectious diseases we now know much about the "life history" (or general facts of the necessary conditions of growing, etc.) of the various germs that are the causes. This enables us to avoid or to destroy them or to remove the conditions that favor them. This is the greater part of the duties of sanitarians and public health officers.

There is a great difference in the **susceptibility** of different people to any disease. Thus, of a number who are all exposed, some may not take it, others may take it in mild form, and others very severely. As a rule, one does not take an infectious disease more than once. This is due to **immunity**, which is acquired during the course of the disease. Some people are **naturally immune**, and the immunity (or power of resistance, due to a substance in the blood) is not always the same in an individual, this depending largely on the state of his general health. Moreover, a person may not develop a disease from a small dose of the infection, but a larger dose may set up the disease in him. The prevention of infection is now much better understood and carried out than it was a few years ago. Thus, in the German army there were 22,218 cases of infectious diseases in 1869; 11,467 in 1874; 4,695 in 1879; and 4,077 in 1895, although the number of soldiers in the army has steadily increased since 1870.

The general measures by which infectious diseases are reduced in number (or may be avoided) are: 1. Isolating the patients away

from the public and destroying their infecting discharges. 2. Removing or destroying favoring conditions, such as filth and dampness. 3. Purifying infected materials, such as clothes, bedding, books, etc., by heat or by germicides (disinfectants). 4. Destroying such agents as mosquitoes, flies, rats, that spread the disease. 5. Sterilizing food by cooking it and drinking water by boiling it (milk is in many cases the source of an infection, as also are fresh vegetables, oysters, etc., eaten uncooked). 6. By keeping up the standard of your own general health, avoiding excesses of any kind, having good food, abundant fresh air and sunlight and plenty of sleep, and keeping a cheerful state of mind. Fear of a disease actually renders one more liable to it, by lowering one's general health, and many people become positively ill or at least have miserable health just from reading the advertisements of patent medicines. These always magnify trifling ills and simple disorders to which nearly everyone, even the healthiest, is subject, so that they seem to be the symptoms of a terrible disease, which only the said patent medicine can cure. Therefore, to the above preventive measures may well be added this: Avoid reading or even glancing at patent medicine advertisements, even as you would shun a dose of poison! Burn all medical advertising matter just as soon as you would the seeds of bad weeds that might blow about your garden or farm.

INSTRUCTION THIRTY-EIGHT—*Infectious Diseases*

Medical Diseases-Contagious

INFECTIOUS DISEASES CAUSED BY BACTERIA AND OTHER GERMS.

Typhoid Fever, Smallpox, Vaccination, Chicken-
pox, Scarlet Fever, Measles, Diphtheria,
Mumps, Whooping Cough.

Subject Reference

*For Standard
Disinfectants, see
pages 360-361.*

Influenza, Cerebro-Spinal Meningitis, Consumption, Plague,
Malaria, Intermittent Fever, Ague.

Fever.

Fever is that condition of the body in which the temperature of the blood is raised above normal (98.4 degrees F.), the pulse is quickened, the skin hotter than natural, thirst present, and the functions generally disordered. This feverish state of the system may arise from various local and other affections. It is due to a **poison** acting on the nervous center that regulates heat production and heat dispersion by the body.

Fevers constitute a large class of diseases due to a specific virus, the nature of which science has not yet been able to elucidate, and which may exist in the air, or in water, or in the clothes we wear; and when it enters the body it finds there a genial soil on which it may not only live, but prosper. The poison thus introduced lies dormant for a time, during which it is said to be germinating or incubating; after an interval, certain constitutional changes take place, manifesting themselves in the blood, by an increase of the pulse and heightened temperature. This condition, constituting the first stage of fever, does not determine what the issue may be, but after another interval, varying from three, four, seven, or eight days, and even longer, certain symptoms supervene, of such a definite type that a medical man is able to pronounce what the nature of the fever may

PERIODS OF INCUBATION, THE APPEARANCES AND CHARACTERS OF THE RASHES IN ERUPTIVE FEVERS.*

Disease.	Incubation.	Day of Appearance of Rash.	Character of Rash.	Time Rash Fades.	Duration of Rash.
Measles. <i>Rubeola.</i>	10 to 14 days.	4th day of fever, after 72 hours' illness.	Small red dots, resembling flea bites, first appearing on temples and forehead, forming blotches with semilunar borders.	On the 7th day of fever.	6 to 10 days.
Scarlet Fever. <i>Scarlatina.</i>	1 to 6 days. occasionally. 21 days.	2d day of fever, after 24 hours' illness.	Bright scarlet, rapidly spreading, first on chest and upper extremities.	On 5th day of fever.	8 to 9 days.
Typhus Fever. <i>Ship Fever.</i>	1 to 12 days.	4th to 7th day.	Mulberry colored patches, general and abundant over abdomen, extending to extremities.		14 to 21 days.
Typhoid Fever. <i>Enteric Fever.</i>	10 to 14 days. or suddenly.	7th to 14th day.	Rose colored papules, elevated, few in number, limited to trunk, fresh spots persisting to occur during course of disease.		22 to 30 days.
Small Pox. <i>Variola.</i>	10 to 14 days.	3d day of fever, after 48 hours' illness.	Small round red hard pimples forming vesicles (<i>umbilicated</i>), then pustules, first appearing on face and wrists.	9th day scabs form and about 14th day fall off.	14 to 21 days.
Chicken Pox. <i>Varicella.</i>	4 days.	2d day of fever, after 24 hours' illness.	Small rose colored vesicles which do not become pustular.	Slight scabs of short duration.	6 to 7 days.
Erysipelas.	3 to 7 days.	2d or 3d day.	Diffused redness either of a dusky or yellowish hue with swelling.	From 24 to 48 hours.	
Roseola.	6 to 10 days.	After 12 or 36 hours' illness.	Rose colored spots not elevated, occurring regularly at different points.		

PERIOD OF ISOLATION OF PERSONS INFECTED.

Diphtheria, Measles, Scarlet Fever, Small Pox, 40 days; Chicken Pox and Mumps, 25 days. These periods count from the inception of the disease, including the period of incubation. Before the isolation ends the patient should be bathed in a 1 in 4,000 solution of bichloride of mercury (corrosive sublimate).

be. The best marked forms of fever may be divided into, 1, those attended with a rash, technically called exanthems; 2, continued, and 3, periodic fevers. The first comprise small-pox, measles, and scarlet fever, to which might be added typhus and typhoid fevers, as they are each attended with a rash, though usually placed in the category of continued fevers. The remaining fevers most usually met with are **febricula**, relapsing, yellow, remittent, and intermittent fever or ague.

Febricula—This is the mildest form of all fevers. A person suffering from it may be scarcely conscious of its existence, and will probably put it down to the effects of a severe cold. It is very common in children, and mothers dread it, lest it should be the precursor of some more serious complaint, as measles or scarlet fever; but, after a few days, varying from two to three, their fears are dispelled by the restoration of the child to its ordinary health. There are, however, the usual characteristics of the febrile state in febricula, the rapid pulse, the high temperature, pains in the back, great thirst, and often constipated bowels. All these symptoms subside after a little aperient medicine has been administered, or even without it, and usually with the appearance of a copious perspiration.

Typhoid Fever (Enteric Fever; Autumnal Fever).

Cause.—Typhoid is due to a special germ, the **bacillus typhosus**, lodging and growing in the lining of the small intestine. Other parts are also involved, but this is the usual site of the disease. It occurs most commonly in people between 15 and 25 years old, but may occur at any age. Some persons may escape although exposed to the disease. It is seldom that a second attack occurs.

The germs find their way into the body, usually in water, or it may be in milk or food. These germs come from the bowel-discharges of a person with typhoid and from no other source.

Location of the Disease in the Body.—1. It is usually most severe in the lining of the intestine, but is not confined to this, occurring at the same time in the spleen, liver, etc. 2. It may be in the blood—a general septicemia or blood-poisoning. 3. The intestine may be unaffected while the lungs, spleen, kidneys or brain-covering may be attacked. 4. Typhoid may occur with other disease-germs, such as those of diphtheria, tuberculosis or malaria.

Symptoms.—The incubation period (time between getting the germs into the body and the appearance of symptoms) is 10 to 20 days, during which the person feels tired and dislikes work. The

onset is gradual. There may be a chill or chilly feelings, headache, nausea, loss of appetite, pains in the back or legs, and nosebleed. These disorders are due to the poisons (formed by the germs of the disease) taken up by the blood and carried throughout the body. The symptoms get worse and the person goes to bed sick or just quits work altogether and lies around. There is fever, higher each day, up to 103 or 104. The pulse runs up to 100 or 110; the tongue is coated and white; the abdomen is tender and slightly distended. Red spots appear on the skin of the abdomen (or elsewhere sometimes) about the end of the first week. In the second week there is mental dullness instead of headache. The face is heavy, the lips dry and the teeth may be coated. There are diarrhea, tenderness and distension of the abdomen. Death may occur now, or in a mild case the temperature may be normal at the end of the second week.

In the third week the patient is weaker and looks thin. Diarrhea may now first appear. The bowel wall may be perforated by an ulcer, causing fatal peritonitis, or a blood vessel in it may be opened and much blood escape into the bowel, sometimes resulting in death. Convalescence begins usually in the fourth week. The fever gradually disappears, diarrhea stops, the tongue gets clean and appetite for food returns. In bad cases the fourth and fifth weeks may be worse than the third, and heart failure is a special danger. Relapses may occur in the fourth to sixth weeks. In special cases the disease may appear first with one of the following: Severe headache, neuralgia of the face, delirium, stupor or insanity, or the symptoms may be like bronchitis or like pneumonia. There may be such severe vomiting and diarrhea that it resembles a case of poisoning. In those cases known as "walking typhoid" a patient may keep about trying to work or even going a long journey to reach home.

The face at first is flushed and the eyes bright; then the facial expression becomes listless and later it is dull and heavy. In many cases there is a peculiar, disagreeable, musty odor of the skin. The hair may fall out after typhoid, but always grows again. In one case in a hundred of typhoid a large vein (usually that in the leg) becomes plugged up by a clot. The leg swells up and should be kept cool and at rest.

The symptoms are not always the same and the only sure sign of typhoid is the so-called **Widal test**: The typhoid germs may be grown in broth and so kept on hand. The living germs are always in rapid motion, dancing back and forth. A drop of the blood of a typhoid patient mixed with a drop of the broth with the germs in it

soon stops this motion. This may be seen under a microscope. If the germs continue to move the patient has not typhoid.

Very mild cases of typhoid occur and may not be recognized as such. They are just as apt as severe cases to spread the disease.

Treatment.—Much depends on careful nursing and proper diet. (See index for special sections on these.) Little medicine is required. Moderate doses (2 or 3 grains every four hours) of quinine are good. Good whiskey or brandy is necessary only when there is marked weakness, high fever and failing pulse. If there is muttering delirium, twitchings of the arms, legs and head, and a dry tongue, 8 to 12 ounces of whiskey may be given in 24 hours. **Hydrotherapy**, or the use of water, to lower the fever, has long been used. Cold sponging is done with tepid, cold or ice-cold water, according to the height of the fever, for 15 to 20 minutes. Delicate patients or children may be sponged a limb at a time, then the back and abdomen. If nervous symptoms are marked, use the cold pack; wrap the patient in a sheet wrung out of water and then sprinkle him well with a watering can, using cold water. Best of all, use a bath with enough water at 70° F. to cover the patient to his chin; the patient is given a bath every three hours if his temperature is above 102½° F. He should be left in it 15 to 20 minutes, having his head sponged (or water poured on it from a height of a foot or two); the limbs and body should be rubbed by hand thoroughly. When the bath is over, do not dry the patient but wrap him in a dry sheet, cover him with a blanket, give him some food and stimulant and let him rest quietly. Only in peritonitis and hemorrhage from the bowels are the baths not good. The baths reduce the fever, clear the intellect, remove muscle twitchings, tone up the heart, produce sleep and, most important, **make the disease less fatal.**

Prevention of Typhoid.—In cities typhoid fever has steadily diminished, as the drainage and the water supply have been improved. Therefore, these are two important considerations in preventing it. The other two things by which the occurrence of typhoid is avoided are: 1. The destruction of the germs which are produced in immense numbers in every case, being discharged from the patient's body in the stools (bowel-movements) and urine. 2. The proper protection or preparation of food and drinking water (and milk) so that no living germs are swallowed—**boil the water** for drinking or use only what is absolutely safe from contamination; and **cook all food**, especially green vegetables, or wash these carefully in water that has been boiled and then cooled. Also protect food from flies,

as they are very apt to get the germs on their sticky feet and so transfer them to food. Milk should be pasteurized thus: Cover the bottle or jar containing it, set it in water up to its neck in a kettle, bring this to a boil, then set all aside to cool before removing the milk. This kills all germs. Milk should always be kept cool to prevent the multiplication of the germs which it **invariably** contains. Typhoid germs are very hardy and long-lived in water. They are readily killed by sunlight or by thorough drying, but freezing does not hurt them and they may, therefore, be got in ice-water. They may travel long distances in streams or in water in the soil.

Disinfection must be most rigidly carried out for the stools and urine, by receiving these in receptacles containing enough of a good disinfectant to cover the discharge. For this purpose use: a. Corrosive sublimate, 1 ounce in 3 gallons of water, to which add a quarter of a cupful of vinegar, or, b, 1 part of crude carbolic acid added to 9 parts of water, or, c, 10 pounds of copper sulphate (blue vitriol) in 5 gallons of water, or, d, chlorinated lime. The bed-pan should contain a pint of one of the above solutions; the stools or feces are left in this solution 2 hours, then buried or put where there is no risk to drinking water. All articles in the least soiled by feces or urine must be disinfected, but with the carbolic solution, and the patient's perineum sponged off with 1 in 2,000 corrosive sublimate. Attendants or nurses must wash their hands in 1 in 1,000 corrosive sublimate each time after handling the patient or anything used by him. Finally, prevention may be maintained by good health of all who are exposed. Typhoid germs cannot pass through a healthy stomach with good digestion.

It is especially important to know that the germs of typhoid come only from a typhoid patient and from no other source. They may multiply in damp soil or in milk without changing its appearance. Only the discharges of the patient are dangerous. The breath and skin are not infectious.

Typhus Fever.

This is different from typhoid. There is a sudden onset, a blotchy rash, marked nervous symptoms, and usually sudden fall of the fever at the end of two weeks. It is also termed hospital, jail, camp, ship, or "spotted" fever, as it occurs only in overcrowding and poverty. It is very contagious, but is now rare. The disease was formerly confused with typhoid but is distinguished by the more sudden onset, chill at the onset, earlier prostration and earlier nervous disorder.

Treatment consists in sponging for the fever, a supporting diet, plenty of fresh air, and mild opening medicine for the bowel.

Relapsing Fever is due to Obermeier's spirillum. A period of fever for six days is followed by no fever for the same time. Then the fever is repeated and so on three or four times, hence the name. It is very rare now.

Variola or Smallpox.

Smallpox is characterized by a skin eruption that passes through the stages of **papules** (pointed reddened elevations), **vesicles** (containing clear fluid), **pustules** (containing pus) and **crusts** (dried pus). This is usually one of the most virulent diseases. Unvaccinated persons are almost sure to get it if exposed. The germs are reproduced in prodigious numbers in the skin of the patient, and are also discharged in the secretions and excretions from the skin, lungs, bowel, kidneys, etc. In the confluent form the symptoms are much more intense. The rash is more abundant, the face is swollen quite out of shape and altogether the appearance is most terrible, being more horrible than in any other disease, well justifying the dread and terror with which smallpox is regarded. In black smallpox there is bleeding into the skin within two to six days or not until the rash has been out some time. Smallpox **may** occur after vaccination, but never within ten years after vaccination. It is always mild, seldom leaves any mark and is almost never fatal. The death-rate in true smallpox is high, being from 25 to 55 in one hundred cases. It is especially fatal in children. In Montreal in 1885-6 there were 3,164 deaths from smallpox, of which 2,717 were in children under ten years old.

Smallpox may be thought to be measles, chickenpox or some simple skin disease (if mild). Before the rash appears it may be regarded as typhoid fever, grippe, meningitis.

Symptoms.—None appear for 9 to 15 days; usually 12 days elapse between the exposure and the onset, and it may be 20 days before the disease appears. A chill may then occur and may recur. There are intense headache in the front of the head, severe pains in the back and shoulder, and usually vomiting. The headache and pains are more severe than in any other disease. The temperature goes up to 103 or higher the first day, with a rapid pulse. There may be delirium. The patient is restless and suffers much, the eyes are bright, the face flushed and the skin usually dry. A rash like measles or scarlet fever may come out. The true rash does not appear until the

third or fourth day, coming first on the forehead and backs of the wrists. It can be felt as hard points in the skin. **As the rash increases the fever goes down and the patient feels much better.** On the fifth or sixth day the spots have clear tops, which are dimpled in. On the



Fig. 305.

Smallpox. The eruption is in the pustular stage. Notice how abundant it is on the face.

eighth day the fluid becomes turbid and grayish yellow (pus), the dimple disappears and the top becomes rounded so that the spot looks like a large split pea stuck to the surface of the skin. This occurs first on the face and the temperature begins to go up again.

The face is swollen (except the nose). The eyes are partly closed up and the lips protrude. In case of recovery, the fever again goes down on the tenth or eleventh day and convalescence begins. The pustules dry rapidly, first on the face. Whether pitting occurs depends on the severity of the disease. Ordinarily there is not pitting in discrete smallpox. The spots may occur in the mouth and throat, nose and eyes and may cause sore throat and loss of voice for a time. The dried scales are the most important means by which it is spread. The germs are very hard and long-lived and are conveyed long distances by people who have recovered or have nursed others. Street cars and other public places are very common places of infection, and the disease may even be carried some distance in the air.

Forms.—Several forms occur: 1. The mildest or **discrete** smallpox may be mistaken for a simple, harmless thing and may be termed Cuban itch, impetigo, etc. Generally, however, this is a serious disease, although the rash is scattered, the spots not joining together. 2. **Confluent** smallpox is a very dangerous thing. The rash is so thick that the spots cover the skin completely on the face, arms, legs and parts of the body. 3. **Black** or hemorrhagic smallpox is almost invariably fatal. 4. **Varioloid** is smallpox occurring in one who has been vaccinated. It is very mild but may convey the disease in a very severe form. It never occurs except many years after vaccination.

Treatment should always be in isolation. Opium is to be given for the pain and headache. The diet consists of milk and broths and any easily digested food. For the high fever, sponge the patient often or use a wet pack. Give cold drinks often. The face and hands should be covered with lint wrung out of cold water containing carbolic acid (1 in 100) or corrosive sublimate (1 in 2,000). For the itching vaseline is good to smear on; this should also be done in the crusting stage to keep the skin soft. The hair should be cut short. The eyes must be carefully treated; if there are any pocks in them use an eye-wash of 1 per cent silver nitrate once a day. The mouth and nose and throat should be kept clean by sprays and washes. In convalescence frequent baths should be given. The patient must be isolated until the skin is smooth everywhere.

Vaccinia or Vaccination.

Vaccination is a certain preventive of smallpox. As now practised it is free from the many dangers that it carried formerly and on account of which it met with much opposition, that even yet per-

sists among ignorant or misinformed people. Smallpox never has occurred in a person who has been properly vaccinated within ten years. A sore arm and a scar are not proof of true vaccination. The sore must run a course as follows: On the third day after the inoculation (or operation) a little pimple appears (the spot may have faded out meanwhile and a "take" seem unlikely); on the sixth day this becomes filled with a clear fluid and the top is dimpled in. On the eighth day it is at its largest size, is rounded up, distended, more dimpled, and the edge is hard and raised. Redness of the skin surrounds the sore. By the tenth day the fluid is changed to pus, the skin is swollen, hardened and painful. The lymph glands in the armpit become enlarged and painful. On the eleventh or twelfth day the sore begins to dry, to form a scab or crust and the redness lessens. The crust is brownish by the fourteenth day and a week or ten days later it falls off and leaves a **round pitted scar**. If the scab is dry by the eighth or ninth day that is not true vaccination and will not protect against smallpox, and the operation must be repeated. There may be severe headache and pains in the back from the third to the eighth day. If a person, who is not vaccinated, is exposed to smallpox and is vaccinated within three days the disease will not develop. If vaccinated within seven days of being exposed the disease will be much lessened. The procedure is as follows:

The arm should be first thoroughly washed with soap and water and the site of the operation then wiped with alcohol and let dry. **Expose the true skin only**, by removing the false or "scarf" skin with a dull needle (that has just been held in a flame till red and then let cool), and so carefully as **not to draw blood**. The area so exposed should not exceed one-eighth of an inch diameter—this size: **O** and **only one place is necessary**. After the vaccination is made wait a few minutes until the spot is dry and then pin a clean soft handkerchief or a piece of clean soft muslin to the shoulder-seam of the undershirt so as to hang loose over the spot and prevent the sleeve from rubbing it. This must be changed for a clean one every day until the scab comes off and the surface is healed. The protective covering may be rendered clean and sterile by scorching it with a hot iron, or by wetting it and then pressing it with a very hot laundry iron. The vesicle and resulting scab must not be broken or injured in any way and the arm and its coverings must be kept scrupulously clean from the time of the vaccination until it is well.

Because experience has shown that cleanliness and the protection of the surface are best secured by the above method, the use of

"shields," bandages, plasters or other dressings is not recommended; but if these are used—as they are by many physicians—they should only be applied as directed by the physician himself, and with the utmost regard to cleanliness.

It must be repeated that the greatest care should be taken to prevent any breaking of the surface from the time when the scarified spot has dried until the scab drops off naturally. The unbroken surface is Nature's own "shield" against the access of disease germs. Do not scratch or rub, and do not handle the arm or change the handkerchief (or other dressing, if any) with dirty hands.

After a vaccination is made with pure lymph on a clean arm, the important points are to secure and maintain thorough cleanliness of the site of vaccination and to prevent any injury of the surface or breaking of the vesicle. There can be no infection of any kind or severe inflammatory action if these precautions are observed.

The vaccination thus indicated will—if the person be susceptible to smallpox at the time—usually "take" and always leave the typical scar which is the permanent evidence of a successful and thoroughly protective vaccination.

It should be clearly understood that no one is insusceptible to vaccination any more than to smallpox. One successful vaccination can be secured in every person; **to this there is no exception.**

With some persons one vaccination may be protective against smallpox for a lifetime; two vaccinations—one in infancy, another when about 15 years of age—protect most people for life; in comparatively few will vaccination "take" a third time.

The protection of vaccination against smallpox may be positively determined for each individual by repeating the operation from time to time. If the former vaccination is still protective, a re-vaccination will not "take." If it does "take," it is proof positive that the person could have contracted smallpox if exposed to its contagion.

The rule is—**repeat vaccination until the susceptibility to it is exhausted.** When this is done it is impossible to contract smallpox. This is the protection given the employes of the Department of Health who handle and nurse smallpox patients and bury the dead from the disease, and in no instance, among the hundreds so employed, has any one of them ever contracted smallpox.

Varicella (Chickenpox).—Symptoms: Occurs usually in childhood. Ten to fifteen days after exposure the child becomes feverish and may have a chill; vomiting, and pains in the back and legs; convulsions are rare; an eruption appears within 24 hours, first on

the chest or back, usually, but may begin on the face or forehead. At first the eruption or rash is as raised red papules, which in a few hours become changed into rounded vesicles (filled with a clear or turbid fluid); these are very rarely flat or dented in on top. The skin about them is not red. In 36 to 48 hours the fluid in them becomes pus, which dries up and forms a scab by the third or fourth day. New spots continue to appear, so that several stages may be seen at one time. They do not run together (as smallpox may) and number from 8 to 10 to several hundred. As a rule no scar remains, but if the spots are scratched they may become infected and leave deep scars. The disease is often confused with smallpox, but the latter has greater severity at the beginning, is longer in developing a rash; it appears first on the face and is shot-like to touch, and the fever disappears as the rash comes out abundantly.

Treatment.—No special medicine is required. A soothing lotion (of camphor water with three drops of carbolic acid to the ounce) should be used to prevent scratching the face and so avoid pitting.

Scarlet Fever usually occurs before ten years of age, at any season, but most severe in fall or winter. The contagion clings for a long time (even years) to clothing, furniture, toys, books, walls, etc., unless it is destroyed by disinfecting.

Symptoms.—One to seven days (usually 2 to 4) after infection there is a sudden onset, with vomiting and often convulsions; the fever rises quickly and may reach 106, or 105 on the first day. The skin is very dry and hot, the tongue coated and throat dry, and the face is flushed. A rash appears on the second day (or sometimes within 24 hours) in the form of scattered red points, whilst the skin is flushed, first on the neck or chest, spreading quickly so that it may cover the whole skin in two days. It gradually fades after 2 or 3 days. The redness disappears on pressure (as is well seen when the side of a glass tumbler is pressed on the skin). There may be spots of blood in the skin, especially in severe cases. The tongue has a "strawberry" appearance (red points showing through the coating). The breath has a heavy sweet odor. The throat may be slightly sore or very intensely sore, with swelling of the glands below the jaw. The fever goes down as the rash fades, and soon afterward the outer or scarf skin may peel off (desquamation), this lasting 10 to 20 days; the shed skin is highly infectious. In some cases the symptoms are very slight, but these should be just as carefully nursed. The urine is usually scant and high colored. A great danger is that the ear sometimes becomes inflamed and a gathering forms

which may cause permanent deafness. The doctor should be called at once.

Treatment.—See chapter on Fevers.

Measles (Morbilli, Rubeola) is a disease of children, but also occurs in adults more often than scarlet fever. It is highly contagious. It may occur at any season, but is more common in winter. It recurs more frequently than any other infectious disease, so that two, three or even four attacks are common.

Symptoms.—Seven to eighteen days (oftenest 14) after exposure the onset occurs, with signs of a feverish cold. There are shiverings, redness of the eyes, running of the nose, sneezing, light hurts the eyes, and a cough appears usually within 24 hours. There may also be nausea, vomiting and headache. The tongue is coated and the throat red. The fever runs up higher for 2 or 3 days, reaching 102 or 103°. A rash appears on the third or fourth day, on the cheeks or forehead first, and spreading over the neck and chest and also to other parts. The face becomes swollen, blotchy, with, however, patches of skin unaffected. The rash fades in 2 or 3 days and fine branny scales are shed later (finer than in scarlet fever). The rash may appear earlier or as late as the sixth day, and some cases are very mild.

This is a serious disease and must be carefully nursed. The lungs are liable to be involved either at the time by pneumonia or later by tuberculosis.

Treatment.—See chapter on Fevers.

German Measles (Rubella or Rötheln), also called hybrid measles or hybrid scarlet fever, but it is quite distinct from either of these. It is a mild disease usually.

Symptoms.—Ten or twelve days after exposure there are chilliness, headache, pain in back and legs, slight cold in the head and sore throat. Fever is slight (100° or so). A rash like that of measles or like scarlet fever appears on the first to third day, first on the face, next on the chest, and spreading to all parts in 24 hours. The rash is slightly raised, does not cover the whole skin, and fades in 3 or 4 days, leaving a slight stain. The glands in the neck are usually swollen.

Treatment.—See chapter on Fevers.

Diphtheria.—This is infectious and is characterized by the formation of a membrane on a mucous surface, usually the tonsils, palate,

pharynx or posterior part of the nose, or inner surface of the cheek. It may extend into the middle ear, or more often into the larynx and windpipe or even down to branches of the bronchial tubes. The membrane is dense and adherent early, but later becomes soft, shreddy and separates off readily.

Symptoms.—In addition to the sore throat and membrane—which is at first grayish-white, changing to a dirty gray or yellow-white, and which spreads—there are constitutional symptoms due to absorption of the poisons produced by the germs which are present and active where the membrane forms. The presence of the bacillus or germ is the only proof of true diphtheria. There are other forms of sore throat which look like real diphtheria and can be told from it only by a bacteriologist. A swab of the throat must be made to get the material for this examination.

The lymph glands of the neck are usually swollen. The general disturbance of the patient's condition varies greatly; usually it is good, the temperature ranging from 102 to 103° and the pulse 100 to 120. The period of incubation—or interval between the infection and the onset of the symptoms—is 2 to 7 days. At first there are chilliness, fever and aching pains in the back and limbs.

Modes of Infection.—It is highly contagious from one person to another, the germs being received from the discharges from patients, from the secretions of the nose and throat of convalescent diphtheria patients, or from the throats of healthy people who have got them from patients but who do not themselves get ill. The germs attach to the clothing, to the bedding and to everything in the room where the patient is. It has been found on a child's plaything after five months. It has remained in a patient's throat three hundred and sixty-two days. It grows readily in milk without causing any change to the appearance of the milk, and has been found on cheese made in a room where diphtheria was. Cats, fowl and calves are subject to contagious membranous diseases which; however, are not true diphtheria and are not communicable to man. Individual **predisposition** is a variable factor. Many who are exposed escape infection, and the disease does not always develop in those who have the diphtheria germs in their throats, although they may transmit the disease to others. Most cases occur between the ages of 2 and 15. Girls are attacked oftener than boys, and adults are not exempt. It is more common in the cold autumn weather. Enlarged tonsils, chronic catarrh, decayed teeth and an unhealthy mouth and throat are strong predisposing factors.

Treatment.—Regard all cases as suspicious and treat them as diphtheria. Isolate the patient and disinfect everything that comes in contact with him. **Mild cases are as dangerous as the worst.** If death occurs, wrap the body in a sheet soaked in a solution of corrosive sublimate, 1 in 3,000 of water. The funeral should be private.

The patient is to be put in a clean, airy room kept at 68° F. Remove all superfluous carpets, curtains and furniture. Keep the air moist either with an atomizer or with steam from a kettle. Only the nurse, the mother and the doctor should be allowed to see the patient. A nursing mother should not go in the room.

The local treatment consists in swabbing with an antiseptic solution. Loeffler's is the best. It is: Menthol, 10 parts, dissolved in toluol, 30 parts; Liq. Ferri sesquichlorati (solution of iron sesquichloride), 4 parts; absolute alcohol, 60 parts.

Three per cent in 30 per cent alcohol is good. Or tincture of iron perchloride, 1½ drachms; glycerine, 1 ounce; water, 1 ounce; carbolic acid, 15 to 20 drops, is effective. (All in one mixture.)

In nasal diphtheria the nose must be washed thoroughly and frequently with an antiseptic solution, such as 1 part corrosive sublimate, 35 of common table salt and 1,000 of water; or use saturated boric acid solution in water. Use a syringe and inject the solution horizontally in the nose. If the larynx is affected make a tent of a sheet over the bed and pass steam into it to keep the air saturated with moisture. If the breathing is much obstructed give ipecac or zinc sulphate. Make hot applications to the neck of young children, but cold ones (ice bags) for older children and adults. Give liquid food—milk, beef juice, barley water, albumen water, ginger, etc. Encourage the child to drink plenty of cold water. Nutritive enemata may be used when swallowing is very painful. Give stimulants early if the constitutional symptoms are severe. In paralysis in diphtheria rest in bed is required and sudden exertion must be avoided as it has often caused death.

Antitoxin Treatment.—This is the quickest, surest cure for true diphtheria, but it must be used **early** and in **sufficient strength and quantity**. Diphtheria antitoxin is made by injecting cultures of the germs of diphtheria into healthy horses, beginning with small doses and increasing to large doses. An **antitoxin**, or **neutralizer of the poison**, develops in the horse's blood which is ultimately drawn off and the clean or clear part separated from the blood cells and used to inject under the patient's skin. The dose is to be repeated in 18 to 24 hours if no improvement is seen. Usually the swelling of the

throat and the membrane soon begin to disappear, the fever and pulse subside and the patient improves in every way. Any damage to the body which has been done by the poison **before** injection of antitoxin can not be removed by the antitoxin. Great care and caution are necessary in convalescence.

Mumps.—A disease of childhood and youth usually; most common in spring and fall; two or three weeks after exposure to it the child becomes a little feverish and complains of pain just below the ear on one side; a swelling (due to inflammation of the parotid salivary gland) appears here and within two days the cheek and side of the neck are much swollen; the other side is affected a day or two after the first; there is marked difficulty in taking food or even in opening the mouth to speak; there may be earache; any acid food (such as pickles) taken in the mouth increases the pain. The symptoms and swelling subside in seven to ten days and the child then rapidly recovers. The testicles, in adults, may become inflamed, swollen and tender as the inflammation of the parotid gland subsides, or even a week or ten days later. There may be nervous symptoms, which are marked in the few fatal cases.

Treatment.—Keep the child in bed, on light diet and apply hot or cold compresses to the swelling.

Whooping Cough.—An infectious disease, in which there is a convulsive cough, followed by a long-drawn breath, during which a “whoop” is produced. It occurs in winter or spring usually, and often precedes or follows measles or scarlet fever.

Symptoms.—A week or ten days after infection the child develops the **catarrhal stage**, much like an ordinary cold, with slight fever, running nose, red eyes and a dry cough. In a week or so the cough gets worse and whooping begins. This stage is the **paroxysmal**, as the cough is in fits, which occur four or five times a day, or even every half hour. A coughing fit may end with vomiting. The cough is very distressing to witness. It may be brought on by emotion, such as crying, or by any irritation of the throat, as swallowing, and a dusty atmosphere is also bad for it. This stage lasts three or four weeks and then the cough gradually becomes lighter and ceases, or it may run six weeks. The vomiting may cause anemia and wasting away. The lungs may be involved, resulting in broncho-pneumonia. Whooping cough is a serious disease and is often fatal, especially among infants.

Treatment.—Isolate the child and keep it in bed in a room with fresh air in plenty. For the cough, when distressing, give ipecac

wine and paregoric. Also give quinine, 1-6 of a grain for each month of the age of a child under one year, or $1\frac{1}{2}$ grains for each year of the age for a child under five years old. In convalescence take great care, as it is then the lungs are apt to be affected. In tedious cases give tonics, cod-liver oil, good food, and, if possible, a change of air.

La Grippe or Influenza.—A disease remarkable for the rapidity with which it spreads and for the large numbers attacked. It is due to a germ.

Symptoms.—Three or four days after infection the onset occurs, with fever and other signs, according to the form of the disease, which may attack chiefly the lungs, or the stomach and bowels or the nervous system. 1. **Respiratory:** There is running and stopped-up nose, greater prostration and weakness than in an ordinary cold; bronchitis may occur, or pleurisy or pneumonia, which is a very fatal complication. 2. **Gastro-intestinal:** Fever, nausea, vomiting, pain in the abdomen, diarrhea and great weakness are the symptoms in this form. 3. **Nervous form:** Severe headache, pain in the back and joints and great prostration occur. The heart may be irregular, very slow or very fast. Depressed spirits or even nervous disorder may result later. In some cases the only symptom is fever, perhaps with chills, and often much like typhoid fever.

Treatment.—This is a very serious disease, not to be trifled with. It has permanently wrecked the health of many people. Old people should be carefully protected against it by keeping them away from anyone with it. The patient must be put to bed and kept there till there is no longer any fever. Only in this way can serious results be avoided. The patient must be well nursed and carefully fed, to support the strength. Give a dose of calomel (1 grain) or a saline purge (Epsom salts, Rochelle or Seidlitz powders) to clear the bowels out well. At night give 10 grains of Dover's powder. A warm bath is good at the beginning, but be careful to avoid chilling afterwards. Hot lemonade and a warm bed should be ready for the patient as soon as the bath is over. A hot foot bath is good. For high fever, sponging and cold to the head are useful. For weak heart use stimulants and give strychnia during convalescence, which may take weeks and requires great care. Good food, a change of air and pleasant surroundings are needed.

Cerebro-spinal Meningitis is inflammation of the membranes covering the brain (cerebrum) and spinal cord. Termed also "malignant purpuric fever," "petechial fever" and "spotted fever." It occurs in outbreaks in places, more commonly in the country than in cities,

and usually in spring or winter. Children and youths are most susceptible. Over-exertion, exhaustion, depression of mind or body, misery and squalor, all predispose to it.

Symptoms.—These vary greatly. The onset is severe and sudden, usually with violent chills, headache, drowsiness, spasms of the muscles, great depression or weakness, a little fever, a weak, slow pulse (50 to 60 beats a minute); red blotches usually appear in the skin. Or, again, there may be vomiting, fever of 101° or 102° , strong, full pulse; painful stiff neck; increasing headache, dislike of light and sounds, irritability and restlessness, pain in the back and limbs, the eyes turned outward (squint), violent delirium, which later changes to stupor and unconsciousness. It is fortunately not a common disease. Death may result within a few hours or not for some months. Half of the fatal cases end within five days. Many cases recover, and a few become chronic. It is often a difficult question to decide whether the case is one of meningitis, typhoid fever or even smallpox.

Treatment.—A doctor must be called as soon as possible. Cold to the head and along the spine should be continuously applied by ice bags, or the cold pack or sponging used instead. Opium in large doses is to be given to control the pain and spasms. The diet must be nutritious, chiefly milk and broths. It may be necessary to use a stomach tube to give food. Whisky or brandy may be given for the heart weakness.

Pneumonia is inflammation of the lungs. (See under Inflammation.)

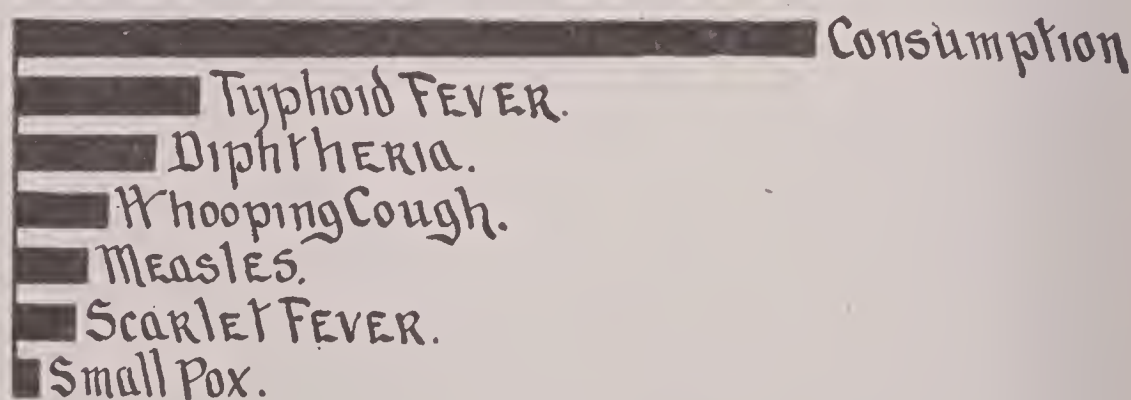


Fig. 306.

This diagram shows the proportion of deaths in one state due to the common infectious diseases. Notice how very few deaths the dreaded smallpox causes as compared with consumption, yet, owing to ignorance of how infectious it is, few hesitate to expose themselves to consumption. If you are vaccinated properly you cannot take smallpox. If you keep your health up to a high standard you are very unlikely to take consumption.

INSTRUCTION THIRTY-NINE—Tuberculosis

Consumption—“Tuberculosis”

One Seventh of Mankind Die of the Great
White Plague.

Subject Reference

*For Activity of
Bacillus Tubercu-
losis, see pp. 53-57.*

*For Inflammation
of Lungs and Pneu-
monia see p. 391-92*

*For Special Pre-
caution, see p. 516.*

Consumption is Preventable and a Curable Disease.

Consumption is a widespread and deadly disease and has been aptly termed the “Great White Plague.” Of all diseases common to man it is the most widespread and the most deadly. Other diseases have caused more dismay, more panic, and occasionally, for short periods, even wider destruction, but consumption has been the most constant and the worst scourge of mankind.

While other diseases have yielded to the progress of science and the greater knowledge of sanitation, consumption claims increasing numbers of victims with each succeeding year. Over five times as many persons die from consumption as die from typhoid fever, and this proportion is annually increasing.

Consumption kills men and women in their prime. Its victims are mostly of the active working age. They die during the period of the greatest usefulness to the state.

Consumption is the cause of one death in every four deaths which take place between the ages of 20 and 50! Fully one-seventh of all mankind die of this disease. One million lives are lost by this disease annually throughout Europe and 150,000 persons die each year in the United States of some form of consumption. Consumption is more prevalent in certain climates and among certain races, but it spares no nation, no age, no occupation, no class of people.

Consumption is a preventable disease and it is a curable disease. Consumption can be prevented or cured, if taken in time, before much lung tissue has been destroyed.

Consumption is caused by the growth of certain germs (bacilli) in the tissues of the body. In the lungs the disease is known as pul-

monary consumption. The germs causing consumption in man and in cattle are the same and the disease may be transmitted from one to the other, by means of the transmission of these germs. There can be no consumption without the consumption germ.

Consumption is very rarely inherited, but children of consumptives often inherit weakened constitutions, predisposing them to disease, which they easily acquire from others. Many cases of so-called

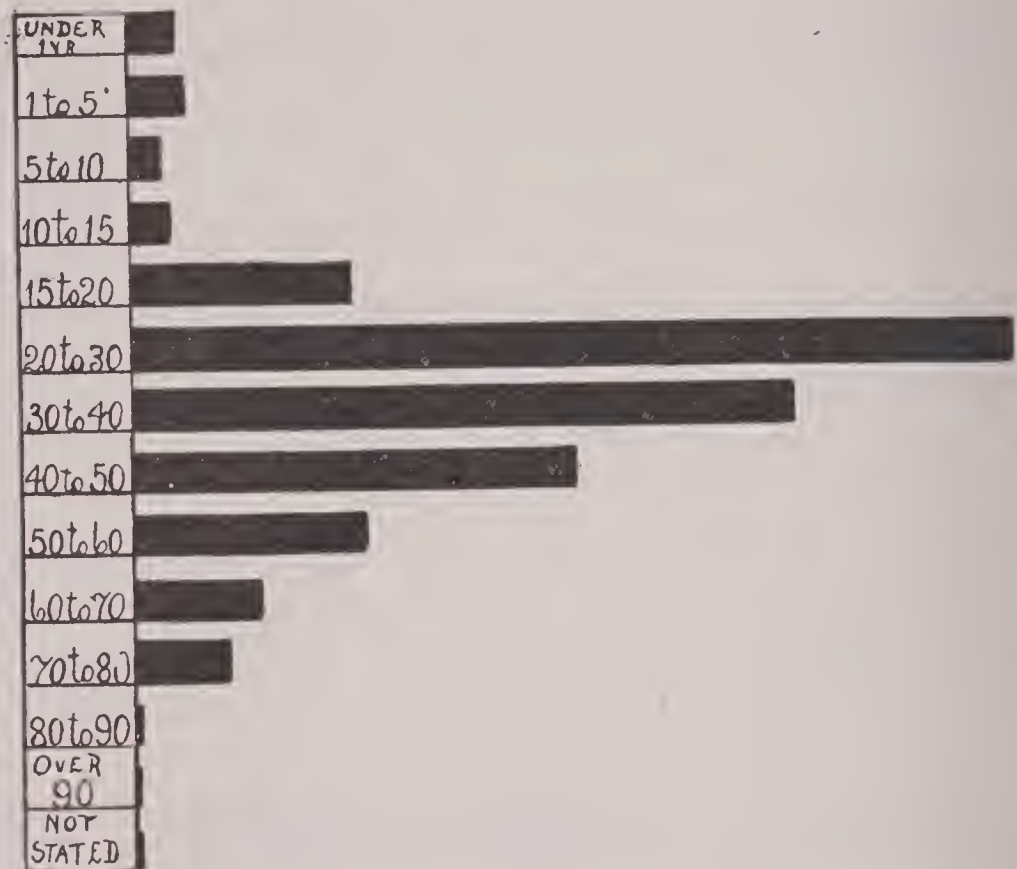


Fig. 307.

This diagram shows the relative numbers of deaths at various ages from consumption. From 20 to 30 years of age is the most critical time. Of course this weeding out before 30 reduces the proportion of susceptible people above that age.

“hereditary consumption” are due to the disease being transmitted from an afflicted member of the family to others, either directly or through the medium of dirt and dust in the infected rooms.

The means by which consumption may be transmitted are (a) through the air passages and into the lungs by dust infected from sputum of consumptives, (b) through drinking glasses, eating utensils and other articles placed to or in the mouth which have been handled or put in the mouth of another, (c) through the digestive tract from diseased meat or milk from tuberculous cows or from food infected by germ-bearing dust, (d) very rarely through the skin.

The consumptive is almost harmless if he is intelligent and careful. He becomes harmful usually through bad habits, which are due, as a rule, to ignorance. The consumptive who walks about or works in offices or shops, will not transmit his disease to those with whom he comes in contact if he takes proper care of his saliva or sputum. Notwithstanding this well demonstrated fact many persons dread the presence of a consumptive and some employers will not even retain him in their service.

The chief mode of communication of consumption is from the dried sputum of consumptives. The germs of consumption (which alone are the cause of the disease) exist by the million in the sputum which may be hawked or coughed up and cast upon the sidewalk, the floors of public halls, workshops, and all public buildings, or upon the floors or carpets in dwellings; in fact, any place where the consumptive chooses to spit.

When the sputum becomes dried up, the germs which it contains in enormous numbers mingle with the air and dust of the building and may be breathed into the lungs and thus infect susceptible persons, one consumptive thus spreading the disease to many others. The danger is increased by the great vitality of the germs; these exist for a long time after drying and mixing with the dust.

The minute drops of the sputum which consumptives expel when coughing also contain the germs of consumption, and floating in the air are easily inhaled by others.

It will thus be seen that the consumptive who is able to be about and goes from place to place and spits on the sidewalk, in the street cars or on the floors of public buildings, the workshop and the like, may be a far greater menace to the lives of others than the consumptive who is confined to his dwelling.

The germs of consumption will often be found among dust and dirt in tenements and other dwellings, where they may retain their vitality for months; also in cast-off clothing. Dampness, darkness, dirt and dust all serve as a refuge for the germ of consumption.

Recent experiments show that it is very probable that the germs of tuberculosis usually enter the body in food (such as milk or cold food) that has been contaminated by the hands or by flies. The germs pass through the wall of the intestine, get into the blood and finally lodge in the lungs where they first set up disease, hence the usual mistaken idea that the germs have entered the lungs direct in the air. Of course air containing dust with consumption germs in it may

be breathed into the mouth or nose, and be arrested there and later swallowed, so that in this case the germs are taken in in dust-laden air.

The sputum should be destroyed. The most certain method of preventing the infection of consumption is the destruction of the sputum of the consumptive. Not only the safety of the people, but the safety of the patient himself requires that the sputum be destroyed before it can have an opportunity to become dried and mingle with the dust of dwellings, offices, factories and other places where human beings congregate.

No spit, no consumption!

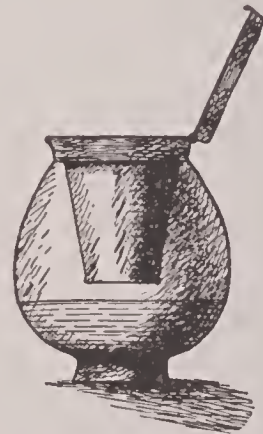
How the Sputum May Be Destroyed.

The consumptive should not spit on the sidewalk or the floor of any building, car or other public place. If he fails to comply with this injunction he menaces the lives and health of others. He can, with comparative safety to the public, spit in gutters, especially those containing water.

No spit no consumption.

Fig. 308.

A convenient pocket spit cup for the use of a consumptive. It contains a strong antiseptic solution and will not leak. It can be emptied and boiled or otherwise disinfected. A cup such as this, or other means of disposing of the sputum so as to destroy it, is one of the things necessary to put an end to consumption.



His room should be provided with vessels or spittoons in which there is constantly kept an abundance of disinfectant solution composed of carbolic acid and water. (Standard disinfectant* No. 1.) This vessel or spittoon, should be emptied in the water closet every day. Care should be used that sputum is cast **into the solution** in the spittoon and **not on the edges**, where it may dry and become an additional source of infection. If any of the sputum adheres to the side or edges of the vessel or spittoon, it should be washed off with the disinfectant solution. Better to immerse the spittoon in a large vessel of the disinfectant for some time.

*See page 360 for list of standard disinfectants.

When away from home the consumptive should carry with him an abundant supply of small pieces of cotton or linen cloth or the like, which may be used instead of handkerchiefs in which he can spit when a proper place is not available. These pieces should be burned, if practicable, before the sputum has an opportunity to dry. If this cannot be done, the cloths should be rolled and put securely in a paraffin paper envelope which should be burned at the first convenient opportunity. Each piece of cloth should be used but once. Pieces of cloth should be used instead of the paper napkins which are sometimes recommended. Paper napkins are fragile, easily torn or broken, are totally unfitted as receptacles for sputum, and a consumptive cannot properly wipe his mouth or hand with one.

If the consumptive desires he can carry with him one of the several styles of pocket spit flasks which are for sale in the shops. These are of great service. They admit of easy cleaning and prevent any escape of the sputum in the pocket. These flasks are superior to the pieces of cloth above recommended, but in practice consumptives hesitate to use these, as they call attention to their disease.

The ordinary spittoon with sloping sides, containing a quantity of a disinfectant, is a good receptacle for sputum. Unpleasant as the appearance of these spittoons in public places may be, were their use more general there would be less consumption. All consumptives will not use pieces of cloth or spit cups, but all consumptives will spit. Under proper regulations public spittoons could be emptied and cleaned regularly. Their universal use would contribute toward the saving of many lives.

Prevention—How to Avoid Consumption.

The important points in the prevention of consumption are: Pure air, sanitary surroundings, an abundance of light and fresh air and cleanliness in the dwelling, office and workshop, proper clothing, good food properly cooked, moderate rest and recreation, avoidance of all excesses; in other words, moderate living. The excessive use of alcoholic liquors lowers vitality, favors infection and hastens a fatal termination.

Every one should be prepared to battle with consumption. The disease spares no class of people. It spreads its terrors in the huts of the poor and the dwellings of the rich. Weakly persons, particularly those who have been exposed to the disease, or those descended from consumptive parents, should constantly be on their guard against this disease. These persons should seek outdoor occupations,

Don't spit on the sidewalk, on the floor of any building, street car or other public conveyance where the sputum will become dry and permit the spread of the germs which it may contain. When you must spit do so in a gutter, especially one containing water, in the opening of a sewer or into a spittoon. Set a good example for the consumptives, and thus contribute towards the saving of many lives, including perchance your own.

No spit, no consumption.

If you yourself are afflicted with consumption (and you may be without knowing it) your spitting on the floors of your apartments may cause a further infection of your own lungs. Consumptives frequently recover from their disease without any treatment whatever if removed from the sources of infection.

Join in the anti-spit crusade. Favor the enactment and enforcement of laws prohibiting spitting on sidewalks, on floors, in street cars or other conveyances.

Fig. 309. A convenient pocket-receptacle for a consumptive. It is a thick paper envelope lined with cotton batting (non-absorbent). It remains folded shut, but may be pressed open for use. It is burned at the end of the day.



Do everything in your power to prevent those with whom you live or work or associate from spitting on carpets or floors of the house, the office or the workshop.

Use every endeavor to cause the consumptive with whom you live, work or associate properly to dispose of his sputum.

If you are a woman, do not wear skirts which sweep the sidewalk on which lies the spit of the consumptives and other filth; thus you will avoid carrying disease into the house.

Don't put in your mouth money or articles which have been handled by others.

Don't put your finger in your mouth or nostrils unless it is perfectly clean.

Don't neglect to wash your hands before you eat.

Keep the body clean. Bathe frequently.

Exercise daily in the open air in cold weather or in warm. Walking, rowing, swimming, cycling, golfing, horseback riding or other

exercises causing deep breathing are all of advantage if practiced in moderation. Walk erect. Breathe through your nostrils always. "Shut your mouth and save your life!"

Don't imagine that the strenuous exercises so much recommended nowadays as a cure for all ills will so strengthen your body as to prevent consumption. Many who have taken such exercises have died of consumption. Many more will succumb to this disease. Many more will die prematurely, as others have in the past, of diseases brought on by violent and unnatural exercises.* Many persons in the first stages of consumption who were not aware of the presence of the disease, have hastened its progress by these exercises.

Don't sleep, if it can be avoided, in a room with a consumptive.

Don't kiss or unnecessarily shake hands with a consumptive.

Keep your premises clean. Have a thorough spring and fall house cleaning every year. See that this is more than "a lick and a promise."

Don't occupy premises formerly occupied by a consumptive, unless the premises have been thoroughly disinfected. Remember that the germ of consumption may retain its vitality for weeks or months in houses, especially when associated with dampness, darkness or dirt.

Overcrowding is one of the chief factors in infection.

The greatest danger of infection is in the house—the dwelling, the workshop, the office—where the sun and fresh air have a much less chance than outdoors. In dark places especially do we find greatest danger. Alleys, courts and rooms shut off from light are special breeding places of consumption.

But do not dread coming near a consumptive. Do not regard his disease as contagious like smallpox, diphtheria or scarlet fever. Much harm has been done through a totally unwarranted fear of the consumptive, which has caused him to be avoided as a leper. Consumptives are only a source of danger through discharges from diseased tissues and if these are destroyed contact with consumptive patients is free from danger.

It has been conclusively demonstrated that there is no infection in the breath of a consumptive.

Don't drink out of any glass, cup or vessel which has been used by another, unless it has been carefully washed. Let this apply to all drinking and eating utensils. Don't wear clothing which has

*"Do not become developed above normal. Athletes die quicker from consumption than their weaker brethren."—Dr. Norman Bridge, of Los Angeles, before Chicago Medical Society, October 6, 1904.

been used by another unless properly disinfected. Avoid "rummage sales."

Don't work in a room where there is no fresh air. Don't sleep in a room where there is no fresh air. Have plenty of fresh air in your sleeping and living rooms the year round, 24 hours a day. Fresh air helps to kill the germ of consumption. Endeavor to breathe an abundance of fresh air day and night.

If your clothing or shoes become wet don't sit still in them, but make a change as soon as possible.

Don't neglect a cold or cough. Countless graves are filled with those who have done so. Colds reduce the vital forces of the body and make it easy for the germ of consumption to get a foothold in the lungs. The history of a large percentage of consumption cases is the history of neglected colds. Watch your general health. A prescription for your cough may save your life and the lives of others. Avoid patent medicines or "cure alls" offered for each and every person.

Don't moisten your finger or thumb with your saliva when you turn the leaves of a book or handle money or papers.

Instructions for School Children, Parents and Teachers.

Regarding Consumption and Schools.

The confinement of large numbers of children together unquestionably makes a school room a source of danger from contagious or infectious diseases. A susceptible child exposed to consumption is exceedingly liable to contract the disease.

No teacher with consumption should teach in a school.

No pupil afflicted with consumption should attend a school.

No employe afflicted with consumption should be allowed to work in the school.

The school room should be always well ventilated. The best uses should be made of all the facilities of ventilation.

The school room should be flushed with fresh air during intermissions by opening windows and doors.

No spit, no consumption.

Children should be instructed to rinse the school drinking cup before using. In cities having running water supplies the use of any drinking cup, except that belonging to the individual child, should

not be permitted. School authorities should install drinking faucets with a constant upward flow from which the children can drink directly. These prevent contagion.

The use of the individual drinking cup is recommended where the upward flow faucet is not available.

Unclean, dusty floors harbor disease germs and are very common carriers for contagion.

The floors of school rooms should be scrubbed frequently.

The floors of school rooms should be wet before sweeping, with sawdust saturated with Standard Disinfectant No. 3, which is inexpensive.

The desks and seats and window ledges should be washed frequently with the same disinfectant.

The entire school room should be disinfected at least once every three months.

Children should breathe through their nostrils. If a child is a "mouth breather" the teacher should call the attention of the parents to the fact that the condition predisposes to nasal or bronchial catarrh and possibly pulmonary complications, and that a doctor can cure the cause of the mouth breathing.

Stooped and cramped posture of the child compresses the chest and prevents natural deep breathing, predisposing to weak and diseased lungs. This may be largely overcome by properly constructed seats and desks suited to the size of the child.

Not only the children but the teachers also should go out doors during recess unless the weather be stormy. This "out dooring" is necessary for the child; it is always desirable for the teacher, and in many cases absolutely necessary.

If you have a tendency to tuberculosis, or consumption, as shown by your having a "family history" of it (i. e., if relatives, such as a parent, brother, sister or parents' brothers or sisters, have died of consumption or are ill of it) you should at once take such steps as will prevent your developing the disease too. If your occupation interferes with your having fresh air 24 hours a day, **change it**. If it exposes you to dust, or is a strain on you or on any part of your body, or if it is depressing to your mind, change to some occupation that is healthful. Above all, study how to be healthy—study **hygiene**, or go to a competent doctor and get him to tell you how to live to avoid ill health. Perhaps there is nothing else so good as a visit of one or two months to a sanitarium for consumptives, where you will learn **how to live**. It may cost you some money, but you can not spend it

so well in any other way. Be careful of your diet (a healthy, properly treated stomach is the best safeguard of health and will defy almost any disease). Do not go to excess in anything—work, play, food or anything else, except fresh air, and there's no excess of it to be had. Be happy—and this is to be congenially and absorbingly engaged in work and play. It may be well to go to a more healthful climate, but this is **very seldom** advisable. **Environment** is far more important than climate. So do not live in a city. Small towns or city suburbs are usually healthful. But it is not **necessary** to do so. You can be well and keep well very likely right where you are. Some brief rules are here given:

Don't expose yourself to the disease—avoid the germs by making sure that you do not live in a house where a consumptive has ever lived, unless it be first thoroughly disinfected. Do not sleep with anyone. As the germs are so numerous and so easily spread and carried into the system, the best preventive is to **have a good resistance to the germs**—if you can't keep an enemy out it is the next best thing to have a home force that can immediately disarm and kill the enemy. Therefore maintain good health by:

A. **Avoiding:**

1. The germ of tuberculosis.
2. Bad air. Open your bedroom window.
3. Excess of anything—work, tobacco, sweets, pies, coffee, etc.
4. Alcohol in any form.
5. Damp room or house—sandy soil is drier than clay.
6. Worry.
7. Too heavy clothing (especially underwear) in the house.
8. Haste at meals.
9. Damp feet.
10. Highly seasoned food.
11. Dust.
12. Ice water.
13. Quack doctors.
14. Patent medicines of any and every kind.

B. **Having:**

Fresh air 24 hours a day.

Plenty of good food, especially fresh meats, good bread and plenty of butter and cream.

Plenty of time to eat.

Your teeth in good repair—a stitch in time saves nine.

A morning sponge bath.

Clothing suitable to the weather.

A right amount of exercise each day.

Eight hours of sound sleep in a room well aired all day and with the window open at night.

A firm bed mattress—no feathers in it.

Light, but warm bed covering.

Congenial, healthful occupation.

Happiness.

Wholesome companions.

A home of your own—as soon as you can, if you are boarding.

A good knowledge of correct hygiene.

(See also "Special Prevention against Consumption.")

Symptoms of Consumption.

The onsets of all cases of consumption are by no means the same. In fact, many people have consumption and the disease is arrested in the very early stages before there have been any symptoms which would cause a suspicion that the disease existed.

The first symptoms of the disease may be loss of appetite and loss of weight, fatigue on slight exertion, general feeling of languor, lack of energy and ambition, rapid pulse, fever in the afternoon and evening and a cough which is most noticeable in the morning. Chills often occur during the early stage of consumption. The cough may have existed for months with practically no impairment of the general health, or the slight, hacking cough, usually worse in the morning, may have been so insignificant or may have occasioned so little annoyance, that the patient will deny having a cough at all or will remember it only after careful questioning. Consumption often follows pneumonia, measles, and whooping cough.

There are other individuals who are subject to "colds," these colds occurring with increasing frequency and each one resisting treatment more stubbornly than the one which preceded it, these attacks leading up to the one which remains. Such an onset of consumption is so insidious that the disease is often firmly established before the patient's suspicion as to the nature of his ailment is at all aroused. Many cases of consumption progress to a serious stage, supposed to be "chronic grippe," "chronic malaria" or "dyspepsia."

Gradual loss of weight should make a person suspicious and should cause him to seek the best medical aid for careful physical examination and examination of the sputum for evidence of consumption. This is especially the case if, in addition to the loss of weight,

there is a loss of appetite with increased frequency of the heart beat, afternoon fever and morning cough.

In a consumptive the temperature often falls below normal (98.6) in the morning and frequently rises to 100 in the evening. It would be well therefore for a person who suspects he has consumption, to take his temperature with a clinical thermometer morning, noon and evenings for several days and make a record of it, which will be of value to the physician whom he consults.

As the disease progresses the symptoms become more marked. The evident wasting, the daily fever and unnatural brightness of the eyes, the flushed cheeks, the night sweats and the continued cough and expectoration indicate more definitely the invasion of the disease.

Hemorrhage from the lungs, following or associated with any of these more or less characteristic symptoms, will point with reasonable certainty to the existence of consumption.

Any or all of these symptoms should cause the patient to seek at once the most competent medical advice. The board of health will make an examination of the sputum, without charge.

Unfortunately, many consumptives fail to heed the advice given them. This is especially true in the earlier stages of the disease, when the patient, instead of availing himself of a method of cure, is apt to be obstinate and to spend a goodly portion of his time in trying to persuade himself, his friends and even his physician that an error has been made in his case. To such patients the evidence brought out by the symptoms presented, by a physical examination of the lungs and a bacteriological examination of the sputum, counts but little. This is unfortunate, not only for the consumptive, but for the people at large.

If You Have Consumption.*

Follow the Golden Rule: "Do unto others as you would that they should do unto you."

It is not necessary that you give the disease to others. You are here told to a great extent how to avoid doing so.

Don't ever spit on any floor. Don't ever spit on any walk. No spit, no consumption.

Don't swallow the sputum you hawk or cough up. It is often the

*These rules are enjoined upon those who are able to follow them. It is not expected that the poor consumptive who lives with his family in a few small rooms and lacks the necessities of life, can carry out all the directions so essential to his recovery to health. The state, county or municipality, or private charity, should care for this consumptive, remove him from the source of infection, and save his family from disease. The treatment of consumption, however, is practicable in the ordinary household, although for many reasons patients can be better treated in well-regulated hospitals for consumptives.

cause of re-infection. Many patients who would recover from the original infection cause incurable disease by swallowing their own germ-laden sputum.

Be hopeful and cheerful. Remember that consumption is often a curable disease and that consumption can often be cured right at home. It is not difficult to cure consumption in its early stages, and it is remarkable how life can be prolonged in patients who are quite far advanced in the disease, but who keep up a continuous fight by living in the open air, and following medical advice as to exercise, diet and mode of living.

There is no other disease in which so much depends upon the individual efforts of the patient. It is not so much a matter of medicines as correct living, proper food, proper exercise and out-of-door life.

Live out-of-doors as much as possible.† Keep at least one window open in your bedroom **day and night, winter and summer.** Don't be afraid of night air. Night air is the only air that you should breathe between 5 to 8 p. m. and 5 to 7 a. m. The air of a closed room should never be breathed. Select a room which has an abundance of sunlight. The largest, sunniest and best ventilated room that you can get. If possible select a dry climate, with at least a moderate elevation, preferably hilly. At any rate, do not live in a house situated on low, wet ground or too much shaded by trees. Sunlight is the greatest enemy of the germ of consumption. The direct rays of the sun, however, are very exhausting to a consumptive, who should at least keep his head and shoulders well protected when out-of-doors.

It has been noted that consumption occurs far more frequently on low, damp soils than upon those which are dry and it is also amply proven that the progress of the disease once acquired may often be checked by removal to a soil which is porous, elevated and dry. The benefits to be gained by the consumptive from a residence on a suitable soil can hardly be overestimated. A gravelly soil of good depth, situated on a slope, makes an ideal site for a consumptive's home.

If you must work, select an outdoor occupation requiring but little manual labor. A change from city life with work indoors to open-air life in the country will often accomplish excellent results.

But you must not exercise too much. Consumptives frequently exercise themselves into the grave. Persons who have fever, a rapid

†See Hygiene of the Sick Room.

pulse, are below weight, or are far advanced in the disease **should not take any exercise at all.** There are times when the **lungs must have almost absolute rest.** As the fever disappears and as the patient gains in strength exercise may be gradually taken, but fatigue must be guarded against. Unnatural exercises have killed many consumptives who might otherwise have recovered. **Beware of the man who tells you to walk several miles daily and expand your lungs. That is dangerous.**

Breathe through your nostrils, not your mouth. Keep your body clean.

Keep out of crowds and away from dust, smoke and dampness if possible.

Smoking is not good for you, but if you must smoke, do so only in the open air. Smoke a pipe or cigar ; **no cigarettes.**

Eat an abundance of properly cooked, wholesome and easily digested food. Plenty of **meat, and bacon, eggs and butter.** A quart of **milk** or more should be drunk daily if possible. Avoid sweets and indigestible things. If you change climate be moderate in your diet during the first few days.

Avoid patent medicines and "cure-alls." There is no medicine known which will cure consumption. In the treatment of this disease drugs are often of value in regulating the functions of the body, but they must be prescribed intelligently. Get the best medical advice and follow it.

Avoid the use of alcoholic drinks unless prescribed by a physician. They may reduce the vitality and, used in excess, will make the patient careless in the protection of others from infection. Drink plenty of good water.

Dispose of your sputum in the manner indicated herein. Don't infect others and don't re-infect yourself. If the sputum you expel is kept moist it will be rendered almost harmless. Be sure that the sputum is properly disinfected before it becomes dust.

When you cough severely hold your handkerchief or a piece of cloth before your mouth. **Don't kiss other persons on the mouth.**

Don't shake hands with people unnecessarily. Keep your hands clean.

Don't work about cattle, or in dairies or sell or prepare or handle any foods to be used by others.

Don't moisten your finger or thumb with your saliva when you turn the leaves of books or count or handle money or papers.

The important essentials in the treatment of your disease: Live

"out-of-doors" day and night, winter and summer. Wear proper clothing. Have no fear of night air and none of draughts. Court the sunshine. Avoid damp houses or rooms. Avoid crowds, smoke and dust. Avoid all excesses. Be careful that you do not exercise when you should rest. Eat plenty of good, nourishing food. Drink plenty of good water. Keep your body clean. Take no drugs except on the advice of a physician. Never swallow the sputum which you hawk or cough up. Be hopeful and cheerful.

Mothers suffering from consumption, either in early or advanced stages, should never nurse their infants. It drains the strength of the mother, hastening fatal termination and subjects the child to danger of infection.

Fresh Air and Sunshine.

Consumption Is A House Disease.

God gave man an abundance of fresh air and sunlight for his daily use. Man, with the perversity which characterizes the human race, immures himself behind wooden or stone walls, and excludes or grudgingly admits even that air and light which is necessary for his well-being. The sickness or death resulting from this violation of the laws of nature is often attributed to "the will of God."

Consumption is a house disease. It is a disease which is produced by residence in houses. The germs which cause it thrive in the living quarters of man where sunlight and fresh air are often excluded. It is in the house that consumption is contracted and in the house that the disease develops. It is in the house that the disease remains, to attack new inmates, weeks or months after the death or departure of the patient by whom the germs were implanted.

Fresh air and lots of it, sunshine and absolute cleanliness are requisites in every household.

The dwelling must not be located on damp ground. It must be freely accessible to the rays of the sun.

The sick room must have an abundance of fresh air, day and night, winter and summer. If this is not the case, the patient will die and it will be impossible to avoid infecting those who are in attendance upon him. The room occupied by the consumptive should face the south if possible, or, better, have the windows both south and east or west. The sun must enter the sick room.

The sick room should be large, easily ventilated and as far from the living and sleeping rooms of other members of the family as it is

practicable to have it. All ornaments, carpets, drapery and other articles not absolutely needed in the room should be removed. A free circulation of air from without should be admitted both day and night and there should be as much sunlight as can be secured. Place the bed as nearly as possible in the middle of the room. **The consumptive should always sleep in a room by himself.**

Scrupulous cleanliness in every portion of the premises should be enforced. All decaying animal and vegetable matter and every kind and source of filth in and about the house should be removed and disinfectants should be freely used. Surface drains and gutters, areas, outhouses, privies, shelters for domestic animals, fowls, etc., should receive close and constant attention and Standard Disinfectant Nos. 1 or 4 should be used freely and regularly in every such place.

Basement and cellars must be kept dry and freely aired. Un-slacked lime should be used liberally in the basements.

The patient should really live out-of-doors day and night. Fresh air and plenty of it is one of the best cures for consumption. There is no danger from draughts if the patient is kept well covered.

Where a proper room is not available in the house, the invalid can make use of an ordinary wall-tent-and-fly in the yard. The tent should have a good board floor, well raised from the ground. Or a wide porch on the house, with an eastern or southern exposure, can be utilized as a sleeping and living room during nights or unpleasant weather. A good way is to fit the bedroom window with a canvas-covered frame, which projects out like an awning and extends in over the patient's head as he lies in bed at night. The bed should be placed by the window and the frame or canvas should fit well down so as to prevent draught. The lower sash is raised or removed. In the daytime the patient should remain outdoors continually if possible. The porch can be boarded in at the bottom and fitted with window glass, which should be so arranged as to permit free entrance of air. In the summer time the porch can be enclosed with wire screen painted white, which permits the free entrance of air and excludes flies, mosquitoes and the vision of the curious.

As already stated, the consumptive in himself is almost harmless. He becomes harmful usually through bad habits, such as spitting.

He becomes harmful also through coughing, a symptom of the disease which the consumptive cannot control. Fine particles of saliva are often expelled in coughing and these, being thrown some distance from the patient, become a very potent means of infection unless extraordinary precautions are taken.

Frequently, when the patient is bedridden, and especially during the last few weeks of life, he is totally unable to prevent the spread of infection and it is often impossible for the attendant to do so. It is necessary, therefore, to constantly clean everything which may become soiled—the bed clothes, clothing of the patient, the floor, the furniture and the walls. A pail or tub of Standard Disinfectant No. 3 should be kept in the sick room and in this all clothing, blankets, sheets, towels, etc., used about the patient or in the room, should be dropped immediately after being used and before being removed from the room. They should be well boiled as soon as it is practicable. Rags, toilet paper or other material used about the person of the patient should be immediately burned. Standard Disinfectant No. 3 may be also used to clean the woodwork, floors, walls, etc.

In the room the sputum should be received in a spit cup or spittoon containing a disinfectant fluid. For patients not able to sit up, a small spit cup with a handle should be used. The spittoon or spit cup should be emptied daily into the water closet, not in the yard. If cloths or handkerchiefs are used, they should be immediately burned. Boxes filled with sand or sawdust should not be used, unless the contents are kept moist with Disinfectant No. 3 and afterwards covered with it for an hour.

The floor, woodwork and furniture of the room should be wiped with a damp cloth and not dusted. A feather duster should never be used. When necessary to sweep, use a broom dampened with a disinfectant solution.

Do not attempt to disinfect a room when occupied by a patient, by the use of volatile chemical agents, as chlorine, sulphur or formaldehyde. It cannot be done, and you simply waste your time and annoy the patient.

If death should occur the body must be wrapped in a sheet thoroughly soaked with Standard Disinfectant No. 3, and placed in an airtight coffin, which must remain in the sick room until removed for burial. Public funerals and wakes over such bodies in the infected house should not be held.

Disinfection. After recovery or death all articles worn by, or that have come in contact with the patient, together with the room and all its contents, should be thoroughly disinfected by burning sulphur in the following manner:

(a) First steam the room or sprinkle it and hang up a wet sheet in it an hour or two before burning the sulphur.

(b) Paste strips or sheets of paper over the keyholes, window

cracks, door cracks, fireplaces, stove holes and other openings except the door of egress. Have all windows and doors shut. See that all chimney flues and fireplaces are tightly closed.

(c) All articles in the room that can not be washed must be spread out on chairs or racks. Clothing, bed covers, etc., should be hung on lines stretched across the room. Mattresses should be opened and set on edge. Window shades and curtains should be spread out full length. If there is a trunk or chest in the room, open it, but let nothing stay in it. Open the pillows, so that the sulphur fumes can reach the feathers. Do not pile articles together.

(d) Use three pounds of powdered or crushed sulphur for every 1,000 cubic feet in the room. A room 10 feet long, 10 feet wide and 10 feet high has 1,000 cubic feet. For a closet half as large, use two pounds of sulphur.

(e) Burn the sulphur in an iron vessel. Take a tub partly filled with hot water, stand some bricks in it; put the sulphur in the vessel, then place the vessel on the bricks; lay a dozen matches together on the sulphur and ignite them, taking care not to inhale the fumes. When the sulphur begins to burn, close the room tightly by sealing the door of egress and keep it closed for ten hours or longer.

Sulphur candles can be used instead of crude sulphur, but care must be taken to use sufficient candles. The average candle on the market contains one pound of sulphur. Three of these will be required in the disinfection of a small room, 10x10x10. Do not use a less number, no matter what directions may accompany the candle. The water-jacketed candle is preferable. Fill the tin around the candle with water and place candles in a pan on the table, not on the floor. Let at least one-half pint of water be vaporized with each candle. If practicable vaporize more water. **In the absence of moisture the fumes of sulphur have no disinfecting power.**

(f) After the apartments are opened, take out all articles and place them in the sunshine. Carpets should be well beaten and exposed to the sun.

(g) All surfaces in the room should then be thoroughly washed with Standard Disinfectant No. 3. Wash well all out-of-the-way places, window ledges, mouldings, etc. Floors, particularly, should receive careful treatment, and the solution should wet the dust and dirt in the cracks.

(h) Mattresses and pillows soiled by discharges should be burned. It is better to burn all toys and articles of small value which have been handled by the patient. Books which have been handled

by the patient can be saved. Lay them on edge on a table with leaves open, in a room during disinfection.

There is one serious objection to the use of sulphur and this should be fully understood. The fumes of sulphur have a destructive action on fabrics of wool, silk, cotton and linen, on tapestries and draperies, and exercise an injurious influence on brass, copper, steel and gilt work. Colored fabrics are frequently changed in appearance and the strength impaired. Fabrics, however, can be effectually disinfected by hanging them on a line exposed to the sun and wind for several days. Curtains and all articles of cotton or linen by boiling and soaking them in Standard Disinfectant No. 3 for several hours, and portable articles, of brass, copper, steel and gilt work, by washing with a strong solution of carbolic acid (Standard Disinfectant No. 1). Colored fabrics which have been in a room during disinfection should be immediately exposed to the sun and wind. Uncolored fabrics which will not be injured by moisture should be at once soaked in water. This action will prevent further injurious action of the sulphur acid.

In the disinfection of stores, halls, school houses and apartments or dwellings in which there are no articles to be injuriously affected by the gas, sulphur is an ideal disinfectant. Its mode of application is simple (the simpler the method in disinfection the better), it is cheap, the material is accessible everywhere, and finally, the most important of all, the action will be invariably found when the sulphur is properly used.

Formaldehyde (formalin) which, when properly generated, possesses all the advantages of sulphur, may be used instead of the latter. (See directions under Fumigation.)

None of the so-called formaldehyde candles found on the market should be used.

As to Climate.

"Climate in consumption is a will-o'-the-wisp. It is the end of the rainbow with its pot of gold. It is ever just a little beyond. It rests in Colorado, New Mexico, Arizona, California. Like children in their simple faith, chasing the rainbow's vanishing end and delving for treasures where once it stood, our patient pursues his phantom till worn and wasted, weary, but hopeful still, he falls asleep and wakes to learn that the magic end of the bow of promise rests upon the mystic shores of the spirit land."

While certain climates may be preferred for certain consumptives,

it is nevertheless the consensus of opinion of the leading authorities of the day that there is no climate which has a specific curative power over consumption. Many hold that cures effected in the home climate in which the patients will have to live and work after their restoration to health are more lasting and assured than cures obtained in more genial climes. While it is known that patients cured in the salubrious regions of the West have been able to return and live in eastern states from whence they came, it is also known that others can never leave the climates in which they recovered, for on their return to their own state their disease recurs.

There are many reasons why an attempt should be made to cure a consumptive patient at or near his own home if it be in a climate not unsuitable for the cure of consumption; many reasons why he should not be sent a long distance from home.

Separation from friends depresses the patient. "Homesickness" is a malady which often baffles the physician.

The expense of the journey is a serious drain on his resources and is often incurred unnecessarily. As has been aptly stated, "many patients could be well put on the road to recovery in their own state at a cost which would barely defray their expenses to and from Colorado and Arizona."

The fatigue of a long journey is bad for a consumptive.

The lack of home comforts in a distant place and the inability often to obtain proper accommodations unless at a prohibitive price naturally handicap the best efforts made to cure the patient.

The expense of living in the states having "specific" climates is great. Even if his disease be cured the patient may not be able to return to live in his home place.

If the patient must work he can find no occupation. Too many have preceded him.

It is known that in certain western states doors are closed to the consumptive and legislation against him is contemplated.

For the wealthy patient, who can be surrounded by his relatives and friends wherever he goes, a change of climate may be desirable; for the poor patient—and consumption is often a disease of the poor—a change of climate frequently quickens an unfavorable termination of his disease.

It is often not so much the best climate for the disease as the best place for the consumptive that has to be considered.

Before changing climate, the consumptive should obtain competent medical assurance that the change will be beneficial. A climate or

altitude which is suitable for one consumptive may cause the speedy death of another. An extremely hot climate is often not only more exhausting but more dangerous to the consumptive than an extremely cold climate.

The consumptive should not go to any state without first informing himself as to the exact locality he is to visit and the certainty of securing suitable accommodations in hospital, hotel or boarding house. A neglect to do this has caused untold trouble and misery to consumptives and has resulted in the death of many unfortunates. Any board of health will gladly furnish any consumptive with a list of the sanatoria and hospitals for consumptives in any of the eastern, southern or western states, with such information regarding the climate and altitude as may be desired.

A good climate for weak lungs allows one much out-of-door life—twenty-four hours a day every day in the year, if possible. Certain climates have been looked upon as specific cures for consumption; **but the disease originates in any climate**, and it can be prevented, or cured in an early stage in **any climate**, by proper hygienic measures. We must, therefore, not overestimate the effect of the climate of the special region in which the patient is placed, though high altitudes undoubtedly have a marked influence on the course of the disease.

Climates depend on several conditions, of which the chief are latitude or distance from the equator, altitude or height above the sea, relative to large areas of land or water, and prevailing wind.

The sea-level is the lowest; it has a high atmospheric pressure which requires only moderate lung-expansion during exercise. Sea air is pure (i. e., free from dust and germs) when the wind is on-shore. The air is usually tonic and bracing and the scenery is of value on account of its effect on the mind. However, high winds occur, and experience shows that the sea coast has not a good climate for consumptives.

The low levels, up to 1200 feet, have not as bracing a climate as either the higher levels or the sea-level. The temperature-changes from night to day are moderate. On the whole, these climates are not usually suitable for consumptives, nor for those whose system is relaxed or run down and who need stimulation.

The moderate levels, 1200 to 3000 feet, are good for delicate people whose nervous system and appetite need stimulation, but who are not well able to endure the great changes in temperature and the greater physical exertion connected with life in the higher altitudes, which

require a strong heart and well-developed respiratory muscles. Moderate levels are therefore best for old people whose hearts are usually not very strong, and whose chest walls are more or less rigid, not permitting full and free respiration. The air in these regions is relatively pure.

The higher levels, above 3000 feet, have a low air-pressure; the air is much colder at night than in the daytime owing to the dryness of the air which allows the heat of the earth to radiate away quickly when the sun goes down. Differences in temperature are sudden and

Fig. 310.

A barometer to measure the air pressure. The bulb or cap below is open and is pressed on by the air, while the long tube is closed above, hence not pressed on by the air. The scale shows how high the top of the mercury in the closed tube is above the surface of the mercury in the cup below.



extreme. The air is usually dry and germ-free. The amount of blood passing through the vessels of the skin and lungs is increased; the rarefied air necessitates freer respiratory movements of the chest. More water and heat are lost from the body, causing greater tissue-changes. These levels are suitable for the more robust, with good digestion, in whom the losses due to rapid tissue-changes can be readily replaced. On the whole, the high altitudes are the best for one predisposed to consumption, if he is not delicate and nervous, his heart is sound and if his arteries and thorax are not rigid with age.

In making a change of climate the greatest care should always be

taken to have the conditions in the new place as good as those at home. Many consumptives would have fared very much better at home than in a greatly more suitable climate where there are a lack of nursing, badly cooked food at some boarding-house or hotel, and no friends to wear off low spirits, and where the high cost of living prevents their having that leisure which is so necessary to the cure of consumption. Those who seek new climates to avoid consumption must, in their new surroundings, be well fed and have healthy, airy rooms and suitable occupations. It is a bad move for such a man living a healthy out-of-door life in Illinois to change to an unhealthy indoor occupation in Colorado.

The greater expansion and the better blood-supply of the lungs in the higher altitudes have much to do with the good effects on the lower and milder types of consumption. But in rapidly advancing cases with fever, when both body and lungs need rest, much positive harm is done by a change to a higher altitude. The treatment by **perfect rest in the open air** at home, in the **recumbent position**, with **feeding up to the full limits of the digestive powers** (not merely to the limits of the appetite, but **forced feeding**) is much more helpful in these advanced cases and accomplishes infinitely more than a mere change of climate.

Simple as may seem the directions to the sufferer from Consumption; plain as may be the course by which he may find health and be given a new lease on life, it must be remembered that there are thousands of sufferers who are unable to avail themselves of even these simple means of cure. Fresh air, sunlight, proper methods of living and reasonable rest are not available to the man who struggles night and day for the mere necessities of life. The hard worked woman with helpless children dependent upon her, must labor in the dark and dingy sweatshop and live in the stuffy tenement, although she may know that in such surroundings Consumption is rapidly placing the mark of death upon her. The poor consumptive must live. No better opportunity for practical charity ever existed; no greater privilege was ever offered than is held out to him who would provide the means for the poor consumptive to regain his health and to face the battle for life and for existence on an equal footing with his fellows. Those who are giving fortunes for the advancement of education, of science, of art and even of religion will do well to pause and consider if saving the life of our fellow man and restoring him to the helpless ones dependent upon him, is not a nobler and a better thing than the elevation of culture to its highest plane or the carrying of learning to the natives of foreign shores.

STANDARD DISINFECTANTS.

Disinfection will not take the place of cleanliness! Cleanliness alone is far better than disinfection and uncleanness.

The following are simple, cheap and most reliable disinfectants:

Standard Disinfectant No. 1.

Four per cent solution of Chloride of Lime.

Dissolve Chloride of Lime of the best quality, in water, in proportions of six ounces of lime, to one gallon of water.

This is one of the strongest disinfectants known. Discharges from the bowels of a patient suffering from a contagious or infectious disease, should be received in a vessel containing this solution, and allowed to stand for an hour or more before being thrown into the vault or water closet. Discharges from the throat or lungs should be received in a vessel containing this solution.

Chloride of Lime in powder should be used freely in privy vaults, cess pools, drains, sinks, etc.

Instead of the solution of chloride of lime, crude carbolic acid may be used for the same purposes, in a strength of $6\frac{1}{2}$ ounces to the gallon of water. This makes a 5 per cent solution of carbolic acid.

Standard Disinfectant No. 2.

Bichloride of Mercury, 1-500.

Dissolve corrosive sublimate and muriate of ammonia in water, in the proportion of two drachms (120 grains,— $\frac{1}{4}$ ounce) of each to the gallon of water. Dissolve in a wooden tub, barrel or pail or an earthen crock. This and also No. 3 are highly poisonous and care must be taken to avoid poisoning accidents with children, etc.

Use for the same purpose and in the same way as No. 1. Equally effective but slower in action, so that it is necessary to let the mixture (disinfectant and infected material) stand for about four hours before disposing of it. This solution is odorless, while chloride of lime solution is often objectionable in the sick room on account of its smell.

Standard Disinfectant No. 3.

Bichloride of Mercury, 1-1000.

Dissolve one drachm (60 grains— $\frac{1}{8}$ ounce) each of corrosive sublimate and muriate of ammonia in one gallon of water. Dissolve in a wooden tub, barrel or pail or earthen crock.

Use for the disinfection of soiled underclothing, bed linen, etc.

Immerse the articles for four hours, then wring them out and boil them. This solution is excellent for wetting the floors of offices, stores, workshops, halls and school rooms before sweeping.

Mixed with an equal quantity of water this solution is useful for washing the hands and general surfaces of the bodies of attendants.

☞ Chloride of lime, carbolic acid and corrosive sublimate are deadly poisons.

Standard Disinfectant No. 4.

Milk of Lime (Quick Lime.)

Slack a quart of freshly burnt lime (in small pieces) with three-fourths of a quart of water—or, to be exact, 60 parts of water by weight with 100 of lime. A dry powder of slack lime (hydrate of lime) results. Make milk of lime shortly before it is to be used by mixing one part of this dry hydrate of lime with eight parts (by weight) of water.

Air-slacked lime is worthless. Dry water-slacked lime may be preserved some time if enclosed in an air-tight container. Milk of lime should be freshly prepared, but may be kept a few days if it is closely stoppered.

Quick lime is one of the cheapest of disinfectants. The solution can take the place of chloride of lime, if desired. It should be used freely, in quantity equal in amount to the material to be disinfected. It can be used to whitewash exposed surfaces, to disinfect excreta in the sick room or on the surface of the ground, in sinks, drains, stagnant pools, etc.

Plague.

The symptoms of plague are: A feeling of great languor and lassitude ushers in the attack of plague, which for the most part happens towards evening. There is always a cold stage, though it is seldom of long duration. Heat of skin, headache, and giddiness succeed. The pain of the head is in the temples and eyebrows; the eye appears heavy, dull, and muddy. The expression changes in a remarkable manner. Sometimes there is a wild and furious look; sometimes a look claiming commiseration, with a sunk eye, and contracted feature. The most striking of all the early symptoms of plague is the **staggering**, and the sudden extreme prostration of strength. A strong tendency to void the urine is generally noticed. The stomach is very irritable, and rejects almost everything taken. The tongue is white and moist. The bowels are sometimes torpid, and at other times loose, the evacuations being always highly offensive. The speech

falters. The pulse is at first small, hard, and quick; but after the appearance of buboes it often becomes fuller and softer. It is sometimes intermittent; in point of frequency its average is 100. The heat of the skin is seldom very intense. The head is occasionally perfectly clear and collected; at other times, stupor occurs immediately after the formation of the hot fit. Some cases of the disease are ushered in by a violent fit of mania; the greatest indifference with regard to recovery prevails; this is always reckoned as a most unfavorable symptom.

After one, two, or at the furthest three days, pains in the groin and arm-pits arise from the formation of **buboes**. Those pains are often highly acute, and unless speedily followed by the swelling of the gland, the patient dies delirious. In women, the arm-pit, in men the groins, are chiefly affected. Carbuncles appear at the same time, but indifferently on all parts of the body. The fatal termination is sometimes preceded by violent hæmorrhages from the mouth, nose, or intestines.

The duration of the disease is very various. A few cases are on record where the patient died within a few hours from the invasion. To many it proves fatal during the first paroxysm or period, which includes the time from the evening of the attack to the close of the following night. The third and fifth days are, however, upon the whole, those of the greatest danger. The former is the usual period of the appearance of bubo; the latter, of the abatement of the febrile symptoms. If the patient survives the fifth day, and the bubo is fully formed, he may be considered as nearly out of danger. The convalescence, indeed, is always very tedious, from the extreme debility which the disease leaves; and the patient's life is not unfrequently again put into imminent hazard from the occurrence of gangrene in the extremities.

In the malignant form of plague every variety of treatment has been tried, but with so little effect, that it may be considered as a disease nearly beyond the reach of medicine. The violent headache which occurs during the first twenty-four hours seems to point out the propriety of blood-letting, and it is recommended by the general custom of Turkish practitioners; but in the hands of English surgeons it proved of no avail. In the cases in which it was tried it did not appear, however, to make matters worse. Where mercury can be brought to affect the mouth, it appears to be of some service, but it is seldom that sufficient time is afforded for this specific effect of the remedy. Ether and laudanum are valuable medicines in allaying the

irritability of the stomach. Wine and opium are of no use during the violence of the disease, and bark can seldom be retained. This is much to be regretted, for whenever it can be made to stay on the stomach, even in those severe cases where carbuncles and vibices appear, its good effects are conspicuous. Camphor, bark, and wine are given with much advantage during the period of convalescence. Emetics, purgatives, and the cold affusion have been tried, but it does not appear that they are of any service. Diaphoresis can seldom be produced, owing to the disposition to vomit; but wherever it can be produced, the symptoms seem to be unmitigated by it.

The latest period of the contagion of plague, or that between communication with an affected individual and the appearance, is extremely short, and liable to very little variation. It is scarcely ever less than three days, and it seldom exceeds six. Instances indeed are recorded of the disease not appearing until the tenth day, but these cases are rare.

The contagion spreads to a very small distance only from the body of the patient. The consequence of which is, that the disease is seldom, if ever, communicated, except by actual **contact**.

The dead body does not communicate the disease so readily as the living. This appears to be well understood in Turkey; but that the contagion is sometimes received from the dead body cannot be doubted.

The contagion of plague is readily imparted to **fomites**, in which it may lurk for a very long time, more particularly if excluded from the air.

Rats especially are the carriers of plague infection. They take the disease themselves and die of it. Isolation of those ill with plague and extermination of rats are the chief preventive measures—in addition to cleanliness, good ventilation and good habits. There is a curative serum similar to diphtheria antitoxin.

Remittent or Intermittent Fever, Malaria or Ague.—Remittent fever is always present in most hot climates, where there is much decaying vegetation combined with moisture, and is hence called **malarious**. It is characterized by repeated remissions or relapses and is accompanied with a good deal of disturbance in the functions of the liver, which shows itself often in a yellowness of the skin, but is not nearly so marked as in yellow fever. There are great varieties in the character and severity of the fever in different countries, and in each district where it prevails it appears to have a different name. In Europe, on the borders of the Mediterranean, it is known as the

"Levantine fever," or the **autumnal** fever, as it usually occurs with the fall of the leaf; in India it is spoken of by Englishmen as the puka, jungle, hill, or Bengal fever. The cold stage is preceded by languor, restlessness, and a certain amount of chilliness, which last for a day or two prior to the shivering fit; this is succeeded by the hot stage, which continues usually for ten or twelve hours. Throughout the febrile attack, the pulse is full and compressible, beating from 90 to 120 in a minute, the tongue is dry and furred, and pain is felt at the pit of the stomach, and is often accompanied with vomiting. The duration and severity of the symptoms vary with the type of the disease, and the character of the attack; the hot stage or paroxysm ranging from seven or eight to forty-eight hours, when it subsides usually with full perspiration, but occasionally without any perceptible action of the skin. The interval between the first attack and the next paroxysm, may range from eight to ten, to thirty or thirty-six hours, and these periodic remissions continue for days and weeks without any well-defined course, unless the disease is checked by remedies. It is generally understood, that the second paroxysm will be more severe than the first, but serious symptoms, when they occur, do not usually appear before the third or fourth attacks; these are mostly caused by the brain and nervous system becoming involved in the constitutional disturbance.

The cause of ague is a minute animal which is present in immense numbers in the blood of the patient. The animal infects the red blood cells. It grows for a time and then splits into many pieces; these are set free by the destruction of the blood cell, and each piece or spore enters another blood cell and the same round is repeated. In some forms this occurs every other day, or it may be every third day; or there may be two sets of the germs, which multiply on alternate days. There is a paroxysm or fit of chills and fever every time the germs divide up. Thus there may be a fit every day or only every second or third day. The disease is due to the bite of certain kinds of mosquitoes in which the germs live. The mosquitoes in turn get them in sucking the blood of ague patients. The mosquitoes may be destroyed by putting kerosene on the ponds where they breed, thus preventing the young ones from leaving the water when they hatch. Drainage is also a good way to prevent ague. If there is ague in one's neighborhood, one should try to avoid being bitten by a mosquito. The sure remedy for ague is quinine. Arsenic (as "Fowler's Solution" in doses of 2 to 8 drops every four hours) is also a certain cure. Of quinine, 3 to 5 grains every four hours is the dose. These medicines soon kill the ague germs.

PART SIX—*Diseases Not Infectious*

Medical Diseases

(*Not Contagious*)

Rheumatism—Sunstroke—Diseases of the Mouth
Throat, Nose and Lungs.

Diseases of the Stomach—Inflammation in Gen-
eral—Diseases of the Intestines.

Diseases of the Urinary Organs—Diseases of the Nervous
System—Skin Diseases.

Heart Disease — Hardening of the Arteries.

INSTRUCTION FORTY—*Rheumatism*

Subject Reference

*For Contagious
Diseases, see pages
316-364.*

*For Prescription
for Rheumatism.
see pages 612, 613,
615.*

Rheumatism.—By this name are known two forms of disease, differing greatly from each other, so greatly, indeed, as to be distinguished even by the unprofessional. The **acute** form of rheumatism, called “rheumatic fever,” by medical men, is popularly named the “rheumatics,” whilst the **chronic** form, the “chronic rheumatism” of the physician, is known to the public as simply “rheumatism,” or in vulgar parlance, as “the rheumatiz.” “Muscular rheumatism,” is also included under the term rheumatism.

Acute rheumatism, or rheumatic fever, is characterized by high inflammatory fever; there is shivering, great heat of skin, followed by profuse sour-smelling perspiration; the pulse is rapid and full; the tongue, covered with a white, creamy-looking fur, is red at the tip and margins; there is much thirst, and poor appetite. The urine is scanty and high coloured, and on cooling deposits a large quantity of red sediment. Delirium does not often occur, unless the heart becomes involved. At the same time one or more of the large joints,

or the tissues in the neighbourhood of a joint, become exquisitely tender, swollen, and inflamed, the skin over the affected part turning red. Whatever may be the part or joint first affected in acute rheumatism, it rarely becomes the fixed seat of the disease, which, before long, almost invariably is transferred to some other joint, leaving the one previously affected entirely free, or nearly so; this shifting from one place to another, goes on during the whole period of the disease, and, indeed, constitutes its most characteristic and well-marked feature. Few diseases are accompanied with more pain and suffering than acute rheumatism, the slightest movement often causing the most exquisite torture; the patient lies in a state of helplessness more or less complete, according to the extent of the affection of the joints. A disease which, like acute rheumatism, can thus shift its local indications from one part of the body to another, must evidently be a constitutional one, and there can be no question that it is a blood disease; that is, that it is dependent on a morbid condition of the blood, or the circulation of a poison generated in that fluid. The near resemblance in many ways between gout and rheumatism, renders it probable that a similarity, at least of cause, may be expected. So long as an attack of acute rheumatism confines itself to the joints and parts about them, it is devoid of danger, but, unfortunately, in a very considerable proportion of cases, there is a tendency of the disease to attack some of the "fibrous" structures connected with the heart, which resemble those fibrous tissues which near the joints are the common seat of the disease. These inflammatory rheumatic affections of the heart attack principally the pericardium or outer covering, but the lining membrane (or endocardium) as well as the valves is also often involved. These diseases are complications which are always to be anxiously looked for, and their appearance is to be treated with the utmost caution. The heart affection is more liable to occur the younger the subject, and, indeed, where strong hereditary predisposition to rheumatic affection exists, the heart in a child may become affected rheumatically, and the foundation laid of future incurable disease, without any of the usual joint affection of rheumatic fever being mixed up with the first attack, which has probably been passed over as a feverish cold. Probably, such cases are not common, but their possibility should put parents, who are aware of hereditary predisposition to acute rheumatic disease, upon their guard as respects their children. In considering the causes of acute rheumatism, the strong predisposition that exists in individuals and families is most important; for in such

persons extra care is always requisite, as they are liable to become the subjects of the disease from conditions which would leave others quite unaffected. **Hereditary predisposition** to acute rheumatic affection ought always to be considered by parents in directing or advising upon the future destinations of their children, who ought never to engage in any occupations which may involve much exposure to the weather, for if they do, they almost certainly become the victims of rheumatic fever, involving long and painful present illness, and in all probability laying the foundation of years of future suffering, and of half usefulness, from heart disease.

Of the direct causes of acute rheumatism, **cold and damp** combined are the most usual; consequently, the poor and ill-clad suffer most frequently from the disease, although any person exposed to such influence is liable to be similarly affected. For the above reason, acute rheumatic affections are most prevalent during cold, wet weather; they are, however, by no means uncommon during the prevalence of extreme heat. This circumstance is perhaps traceable to the fact that persons are apt to have the free action of the skin, the profuse perspiration, checked by incautious exposure in hot weather. The disease is most generally met with between the age of puberty and the fortieth year; it is more common among males than females.

The long continuance of the disease, its painful nature, and, above all, the possibility, almost probability, of so serious a complication as affection of the heart arising during its progress, render proper medical assistance from the first highly desirable.

When an individual who has either suffered from an attack of acute rheumatism, or is predisposed to it, or indeed when any one, after exposure likely to produce an attack, suspects the disease to be impending, the first efforts should be to excite the free action of the skin. A warm or vapour bath is highly desirable; the best substitute will be a well-warmed bed, with hot bran bags, or hot bottles, and the free use of warm diluent drinks. A draught, composed of half an ounce of spirit of mindererus, one drachm of paregoric, and fifteen drops of ipecacuanha wine, in a wine-glassful of water, may be given every four or five hours, or a drachm of sweet spirit of nitre may be substituted for the mindererus. To the above draught, fifteen minims of solution (or ten grains of the bicarbonate) of potash may be added with advantage. Under the above circumstances, any stimulant diaphoretic may be given with benefit, even a little gin, or other spirit, or wine, well diluted with hot water; these stimuli being used, of course, only at first, and whilst fever is not yet present.

When an attack of acute rheumatism, with the symptoms detailed above, is certainly established, if medical assistance is not immediately procurable, the patient must be kept in bed, **moderately warm**, the thirst quenched by the free use of simple diluent drinks, and the diet reduced to a very low scale, anything like alcoholic stimuli, or animal preparations, being strictly forbidden, except in the cases of very debilitated persons, when animal broths, such as beef tea, may be given in moderation. If fever runs high, tartar emetic, in from an eighth to a fourth of a grain-dose, may be given every four, five, or six hours, and with this, from six to ten drops of laudanum may be combined to alleviate the pain. This will, however, under the circumstances, be better effected by one grain or two grains of solid opium, given at bedtime, along with five grains of calomel, the dose being followed in the morning by a purgative, a black draught, or senna alone, or, in a strong subject, senna combined with Epsom salts. The safest way of managing the opium is to give a grain the first night, and if that does not procure sleep, gradually increase the dose. If the mouth becomes affected by the calomel it must of course be discontinued. Instead of simple opium, Dover's powder, in doses of from five to twenty grains (for adults, for children's doses see table of doses) may be given, likewise combined with calomel, and followed in the same manner by the purgative. The above measures may with safety be adopted in the absence of medical assistance. More recently, the treatment of acute rheumatism by lemon juice, has come into practice, and seems in many cases to answer extremely well. This treatment has the advantage of being perfectly safe. One tablespoonful or half an ounce of lemon juice, is to be given every four hours. The "alkaline treatment" of acute rheumatism has been largely adopted, and has been found to be very beneficial in relieving pain and hastening convalescence. Bicarbonate of potash, in doses varying from twenty to thirty grains, given in milk or barley-water every four hours, may be employed alone, or in combination with the acetate or nitrate of potash. The remedy which before all others has come of late years into universal use in rheumatic fever is salicine, as it has the remarkable power of reducing the temperature, relieving pain, and shortening the malady. Salicine and its preparation, salicylic acid, and salicylate of soda, are given in doses of ten, twenty, or even thirty grains every three or four hours. Salicine, in large and frequent doses is often the cause of mental excitement and aberration, and it may be necessary to discontinue it. Aspirin and colchicin are two

valuable recently discovered drugs for rheumatism. The dose of them is 2 to 5 grains in capsule every four hours. As regards the local treatment of the inflamed joints, little is to be done in a disease which shifts its site so rapidly as acute rheumatism; hot bran bags sometimes give relief, but perhaps the following simple plan will be the most advantageous method of local treatment. When the joints are much swollen and painful, much ease may be given by enveloping them in a large quantity of cotton batting—"cotton wool"—over which wrap **completely** a piece of oiled silk, gutta percha tissue or ordinary oil cloth secured by a few loops of a bandage. By this airtight covering, the joints are kept in a perfect vapour bath, and when it is removed after twelve or twenty-four hours, the wool will be saturated with moisture which is strongly acid. This treatment affords great relief, supports and keeps the limb steady, and at the same time promotes sweating.

There are few diseases so tedious as acute rheumatism; it may disappear quickly, possibly in a week, or it may ebb and flow to ten, twelve, or fifteen weeks, in spite of the best treatment; but yet, provided the heart and the brain remain unaffected, it is free from danger, and, generally speaking, does not leave joints which have been severely affected worse than they were before. It has been said that there is a rheumatic predisposition: not only does this show itself in a tendency to attacks of acute rheumatism properly so called, but it tends to modify any inflammatory action in the body, as for instance in the eye, when it gives rise to the peculiar "rheumatic inflammation." The causes of acute rheumatism already pointed out suggest the precautions to be adopted, especially when liability to the disease exists. Cold and wet are particularly to be guarded against, and, after exposure, the preventive measures already laid down adopted. Flannel or wool stuff worn next the skin, must always be regarded as one of the chief preventives; it should of course be proportioned in thickness to the season and temperature. Some persons imagine that their liability to rheumatism, either acute or chronic, is increased by flannel; if it is, it is probably because the wool keeps the skin in too excited a state, by increasing perspiration; in such cases, woven silk when it can be afforded, is useful, or spun cotton, may be used in winter: many rheumatic patients find their chief protection in an under dress of chamois leather. At all events, perfect warm clothing and protection against suppressed perspiration is essential in all such cases. Many of the above precautionary measures apply likewise to chronic rheumatism. Persons of full

habit liable to rheumatic attacks should eschew malt liquor generally, should take animal food sparingly, and avoid violent exertions which heat the body. Persons of spare or feeble habit may live better, and indeed require to keep up the condition of the body to as good a pitch as possible. See also Index.

Chronic Rheumatism.—There are various forms of chronic rheumatism, but most familiar is the rheumatic affection of old people, associated with chronic pain, stiffness, and swelling of one or other of the larger joints, and which most frequently shows itself in persons who have been much exposed to cold and wet. The symptoms are aggravated by change of season, east winds, and exposure.

Chronic rheumatism proper, however, is a disease somewhat resembling the acute form, with slight febrile derangement, if there is fever at all, and affecting one or more of the joints, generally the smaller ones, which continue for a greater or less length of time swollen and tender, the inflammation either subsiding without effect, or after long continuance, causing permanent thickening around the joints, probably with permanent distortion; the process being more or less accompanied with pain. In this form of rheumatism, instead of heat, there is often a sensation of cold around the affected parts. The chronic nature of this disease must generally place it under proper medical control; the chief efforts of the unprofessional must be, to correct any slight deviations from the general health, to protect the affected parts especially from cold, by means of warm clothing, and to use friction, either with simple oil, or by means of the compound camphor oil combined with soap and opium liniment, one-third of the former, to two of the latter. Much comfort is derived from friction, and if combined with proper exercise of the joint or joints, it may do much to prevent permanent deformity. In the class of cases relieved by warmth, **guaiaicum** is a valuable remedy. It is best given in the form of the **ammoniated tincture**, of which a tea-spoonful may be taken in milk three times a day, or the **guaiaicum mixture** may be used in two table-spoonful doses three times daily. The vapor (see baths) and Turkish baths are often found valuable remedies. In chronic rheumatism warmth of climate is of much importance.

Sunstroke or Thermic Fever

Insolation.

Cause.—Exposure to excessive heat, usually of the sun, especially during heavy work.

Symptoms.—Most cases are preceded by pain in the head; wandering of the thoughts, or an inability to think at all; disturbed vision; irritability of temper; sense of pain or weight at the pit of the stomach; inability to breathe easily. Very soon the patient feels unable to walk or stand, and sinks down in a state of more or less complete unconsciousness; the face is red and flushed; the temperature much elevated, even to 110° or 112° F.

Treatment.—Reduce the temperature as rapidly as possible, using ice or cold water on the head and body. In case of very difficult breathing bleed the patient freely by opening a vein in the arm. Give chloroform if convulsions occur.

Preventive.—During warm weather **all** use whatever of malt, fermented, or distilled drinks should be avoided. A hat that permits the air to pass through, the top lined with one thickness of flannel, or a silk handkerchief, or a wet cabbage or plantain leaf in the crown, or wetting the hair frequently, is useful to prevent sunstroke. Persons who feel the symptoms above named should immediately get in the shade.

Everything in any way calculated to lower the **strength** should be avoided. Sleep is a most wonderful restorer of strength, and the want of it is often due to a badly assorted late meal of the evening before. **Defective** ventilation favors sunstroke.

Drinking large quantities of **cold water** in very hot weather, merely because it is cold, should be avoided, particularly just before, during, and after meals.

Loosely fitting clothes should be worn, and baths should be regularly taken. The hair of the head should be wet occasionally.

Make hot applications. If hot water cannot be obtained at first, bathe the head with tepid water, and, with the hands moistened, rub the extremities, the neck, and the whole length of the spine, rubbing in a downward direction to draw blood from the head. As soon as boiling water can be obtained, put a dry blanket around the body, then wring flannels from the hot water and apply them quickly to the region of the stomach, liver, bowels, and spine over the blanket; also immerse the feet in hot water, or wrap the legs in hot flannels as

far as the body. Re-wring the flannels once every five or eight minutes for half an hour or more, then remove them and apply cool water in the same way, either by wet towels or by sponging with cool water; dry well and rub the surface lightly and briskly with the hand until a glow is produced. As soon as the patient can swallow, give hot water to drink, plenty of it, with occasional bits of ice, or sips of cold water.

Myxœdema is a disease of the thyroid gland in which the gland is shrunk and does not secrete properly. Cretinism is a form which is present at birth or before puberty; development is retarded, infantile characters persist and a marked disproportion between parts of the body. At 6 or 7 months of age the condition is first noticed; the child grows very slowly and is mentally dull, the tongue looks large and hangs out, the hair is thin and the skin dry. During the second year the face looks bloated, pale and waxy; the eyelids puffy, the nose thick and flat, the teeth come late and decay early, the belly is large, legs thick and short, hands and feet pudgy; the fontanelles do not close and the child cannot stand up, the mind remains undeveloped. Myxœdema of adults (Gull's disease) occurs oftenest in women.

INSTRUCTION FORTY-TWO—*Respiratory Diseases*

Subject Reference

See *Inflammation*, pages 2, 15, 164, 335, 372, 374, 390, 408, 409.

For *Inflammation of the Lungs*, see also *Pneumonia*, pages 336; *Prescription*, 614.

Diseases of the Mouth, Nose, Throat and Lungs

Inflammation of the Mouth, Canker, Quinsy, Sore Throat, Tonsillitis, Laryngitis, Croup.

Hoarseness, Loss of Voice, Clergyman's Sore Throat, Bad Odor of Breath, Cold in Head, Catarrh.

How to Avoid Catching Cold, Cough, Bronchitis, INFLAMMATION OF THE LUNGS, Hay Fever, Asthma.

Inflammation of the Mouth.

This is usually the result of digestive disorders, or lack of attention to the mouth and teeth.

Small sores or ulcers appear on the tongue, gums, or cheeks. They have a pearly white, punched-out appearance, and are quite sore. In mothers who are nursing they sometimes are quite large and troublesome.

Treatment.—First the bowels should be attended to. The diet should be light, nutritious, and readily digestible. Each ulcer should be touched with stick lunar caustic (nitrate of silver), or with alum. A

mouth-wash of potassium chlorate or borax dissolved in water, or any mild alkaline antiseptic, should be used. Glyco-thymoline is excellent.

Thrush is a form of inflammation of the mouth, usually occurring in infants and caused by a fungus, growing in the mucous membrane.

Treatment.—Mouth-washes, especially one containing bicarbonate of soda, are valuable. The general condition of the patient must be attended to.

Quinsy—Sore Throat.

Sore-Throat.—**Quinsy.**—Sore-throat is not only a concomitant of other affections, such as scarlet fever, croup, and diphtheria, but is one of the most frequent effects of common cold. Some persons are peculiarly liable to it. One of the simplest forms of throat affection from cold is relaxation of the uvula. Perhaps on waking in the morning, the sensation of there being something in the throat which requires to be coughed up, is experienced, and along with this, tickling cough, from the uvula irritating the top of the windpipe. The condition is easily discovered by means of a looking-glass, the uvula appearing longer than usual. Frequently the affection passes off in the course of a few hours; if it does not, the use of an astringent gargle (such as alum water) will remove it.

Sore-throat may be simply inflammation of the mucous membrane of the throat; there is an uncomfortable feeling of roughness or rawness about the fauces and tonsils, with some pain in swallowing, probably accompanied with constitutional symptoms of cold, shivering, etc. This form of sore-throat may pass away in the course of a day or two without going further, or it may spread by extension into the air-passages, causing cough and catarrhal symptoms. It is this form of the affection which is often quickly relieved by the use of the sal prunelle balls, one or two being allowed gradually to dissolve in the mouth. It is generally best treated as a common cold, with the addition of hot poultices up the angles of the jaws, and the use of hot gargles of simple warm water or gruel, or inhaling steam from a jug of hot water, or from one of the numerous inhalers sold for the purpose. This treatment is better than the mustard-plaster and harts-horn and oil, resorted to by some; these, however, may be advantageously used at a later stage. The worst form of sore-throat, apart from what occurs in the course of scarlet fever and diphtheria, is that which is attended with ulceration and sloughing of the tonsils and fauces. This disease is, as a rule, the result of blood poisoning, and requires the most active treatment on the part of the medical man. Tonics, such as the perchloride of iron and quinine, require to be lib-

erally administered, along with port wine and nourishing food, while antiseptic gargles, and the application of caustics and acids to the sloughing parts, are the best remedies.

The sore throats of croup and diphtheria are described under the respective articles.

TONSILITIS.

Inflammation of the Tonsils is usually a result of exposure to wet and cold. It sometimes occurs with rheumatism. It often seems to be contagious, one member of a family after another having it. It begins usually with a chill and fever; the fever may become quite high. The throat is sore, and there is much difficulty in swallowing. The tonsils, red and swollen, sometimes with pus-like material upon them.

Treatment.—Cold cloths around the neck and bits of ice to suck and to swallow are pleasing and of great service in the early stages. The finger-tip may be moistened, dipped into bicarbonate of soda (ordinary baking soda), and then applied to the tonsil. This is to be repeated every hour. The soda should be rubbed all over the surface of the tonsil. Mouth-washes should be freely used. It is well to open the bowels freely with a dose of salts (Epsom, Rochelle, Glauber or Seidlitz powder). Tincture of aconite, **cautiously given**, is useful when the fever is high. This is, however, a dangerous drug. The dose is two drops in a little water every ten minutes till the pulse gets soft and the skin is moist—usually five to eight doses in all. Gargles may be tried; a dram of tincture of iron to an ounce of water and glycerine in equal parts is one of the best. Plain salt water is a good gargle.

QUINSY—SUPPURATIVE TONSILITIS.

In quinsy, the inflammatory action is usually deeper than in the above-mentioned forms of the disease, and affects the substance of the tonsils and surrounding tissues. It usually ends in the formation of abscess. Quinsy is sometimes a most distressing disease, the swelling caused both by the inflammation and by the matter preventing the swallowing even of fluids, which, when the attempt is made, instead of passing down, regurgitate into the nose; in bad cases the breathing is impeded, and when this occurs the case must always be regarded seriously. The feeling attendant on quinsy is rather one of extreme distress than of acute pain, except when the attempt to swallow is made, at which time the pain is often greatly complained of as shooting up to the ears. In some cases the swelling extends down the neck, and completely under the jaws, affecting the tongue and the salivary glands. When this occurs, the flow of saliva is generally profuse, and in all cases there is formation of much stringy mucus about the tonsils. The voice is thick and husky, the tongue very much furred, and the breath offensive. Along with these local symptoms

of quinsy, there is always more or less fever, and if the disease be long continued, considerable depression from the deprivation of nourishment. The treatment of quinsy in the first instance, is like that of common cold. If the symptoms are severe, and if the person has suffered from the disease previously, bran poultices, hot gargles, and steaming may be used, with saline aperients combined with guaiacum. Epsom salts, six drachms dissolved in eight ounces of water, to which is to be added a drachm and a half of powder of guaiacum, and two scruples of compound powder of tragacanth is a good remedy. One sixth part of this mixture may be given every four hours till the bowels are freely moved. Tincture of aconite, in doses of five minims, for an adult, repeated every three or four hours, quickly checks sore throat in its inflammatory stage, and may, if necessary, be given for four or five times in succession, but with care and watching, lest it depress the patient too much. Of course, in the case of the young, though no less valuable, the dose must be proportionally less. A young child might have a quarter of a minim every two or three hours. If the patient can swallow it, medicine in the effervescing form always gives relief, by clearing the mouth and throat; nothing answers better than the common soda effervescing powder, with the addition of six or eight grains of nitre, for strong, fleshy people; or of a teaspoonful of nitrous ether in weak constitutions, in each dose. The above measures may be continued until the matter, if it forms, discharges. When this occurs, the distress, which has perhaps been great, disappears at once, and convalescence, generally rapid, commences. The discharged matter, which is usually offensive, may flow out in a perceptible gush, and be spat from the mouth, or it may be unnoticed, and ooze away, passing down the throat. The hot poultices and gargles should be continued to the throat for twelve or eighteen hours after the discharge of the matter, after that time an acid or astringent gargle will generally be most serviceable and grateful, and the poultices may be replaced by flannel, and perhaps by stimulant liniments. At this period, too, it is necessary to support the patient's strength by tonics and stimulants; good nourishment in the shape of beef tea, eggs and milk should be given freely, and wine if necessary.

Blisters are sometimes used in quinsy; at the very commencement they **may** be useful. It has been found that powdered guaiac, given in half-drachm doses every six hours, and even in the more agreeable form of lozenge, at the commencement of quinsy, will frequently cut short the disease.

A person who has suffered from, or is subject to, quinsy, should, after an attack has passed off, use every means of strengthening the throat; by this the attacks may be greatly prevented. Any of the astringent gargles may be used after quinsy, but none perhaps answers better, or is more accessible to the poor, than the decoction of oak-bark. This ought to be used night and morning for some weeks, and when its use is dropped, the person should acquire the habit of gargling the throat with cold water at the above times, **as a regular practice**, and at the same time should, **habitually**, lave freely with cold water, or salt water (at first at least) all around the throat. In this way a tendency to quinsy may be greatly overcome. Further, all unnecessary muffling, either by fur or otherwise, about the neck, should be avoided, for there is no more fertile source of sore-throat. Men who are liable to attacks of sore-throat may diminish and even eradicate the tendency by allowing the beard to grow all round. Should the disease owe its origin to frequently recurring enlargement of the tonsils, these may be snipped off by the surgeon. Doubtless many cases of simple sore-throat may be well managed domestically; but the contingencies of erysipelatous or croupy sore-throat, or of quinsy, which **may** suffocate, must not be lost sight of. The attendance of a medical man gives the only chance for life in such cases.

Laryngitis (inflammation of the lining of the larynx) is caused by exposure to cold and wet, or by inhaling irritating gases. It is sometimes due to misadventure among children, by their breathing through the spout of a boiling tea kettle. In some respects, the disease resembles croup or diphtheria; but may be distinguished from either of these complaints by the cause which produced it, by the absence of the false membrane at the back of the throat, and by its limitation to the upper part of the windpipe. The symptoms are, **great hoarseness** and **difficulty of breathing** (caused by the swollen state of the glottis, amounting to a sense of imminent suffocation), lividity of the lips and pallor of the countenance, combined with an irregular and feeble pulse. In numerous cases, unless relieved by an operation (tracheotomy) which permits breathing to be carried on independent of the larynx, death is liable to ensue. All that the unprofessional can attempt to do in laryngitis is to steam the throat and apply a mustard plaster over "Adam's apple." The patient **must refrain from talking**.

Croup is an inflammatory affection of the larynx. It is peculiar to children—males are more liable to it than females—and when one in a family suffers from the disease, the rest almost certainly have a tendency to it. The malady seldom occurs during the first year of life, but is more frequent from the second to the seventh year; at puberty the tendency to it ceases, although cases of genuine croup have occurred after that period. The rapidity with which croup at

times progresses to a fatal termination, and the distressing character of the malady, always render it a dreaded disease; fortunately, it is one which, if taken in time, is greatly under the control of well-directed treatment. Its dangerous nature must ever make proper medical advice a necessity, but the importance of early, active, remedial measures renders it at the same time highly desirable that treatment should be resorted to without the slightest delay. Croup is sometimes a form of diphtheria. The great danger in croup arises from the possibility of the narrow chink in the larynx, through which the air passes, becoming closed by swelling, but also from a remarkable product of the peculiar inflammation, which is formed upon, or thrown out by the lining membrane of the trachea and larynx; this formation, "false membrane," as it is named, resembles thin leather of an ash color, it often takes the form of the tube which it lines, and indeed is sometimes coughed up in perfectly tubular portions; more generally, however, when this false membrane forms, death is the result, from its clogging up the narrow chink of the larynx, and preventing the ingress of air to the lungs, unless the operation of tracheotomy is resorted to. Croup may begin apparently suddenly; a child goes to bed to all appearances perfectly well, and in the course of two or three hours comes a cough, which strikes even the most unobservant as peculiar, and falling upon the ear of the anxious parent, who has never heard it before, tells at once of danger. The child seems as if it coughed through a brazen tube. Perhaps, at first, the little invalid is not awakened, and if now visited, is found flushed and fevered, moaning slightly perhaps, and restless, the breathing slightly quickened; the cough comes again, the child awakes or is awakened; if it speaks, the voice is hoarse; if it cries, hoarser still. Should the disease be neglected at this time; or go on uncontrolled, the cough, still retaining its peculiar character, becomes more frequent, the breathing quickened, is also accompanied by the characteristic dry wheezing or crowing occasioned by narrowing of the passage through which the air is drawn, the head is thrown back in the efforts to breathe, respiration is insufficiently performed, and the obstruction to the natural current of the circulation is shown in the blue color of the lips, the dusky coldness of the skin, and the affection of the brain, giving rise to partial insensibility or delirium. The pulse, previously quick, becomes still quicker, but at the same time feebler, and at last the child dies in a state of almost unconscious suffocation, and frequently in convulsions. There may, however, in the progress of the disease be intervals of comparative ease, alternating with

paroxysms of spasmodic obstruction to the breathing, threatening, and sometimes causing, immediate suffocation. The average duration of a fatal attack of croup is from three to four days, but it may, and does, terminate much more speedily. When, under proper treatment, the disease is checked, the first best sign is the cough beginning to "loosen," the breathing at the same time becoming tranquil, and the skin moist; the pulse changes from its hard, quick beat to one of a softer and a slower character. Croup does not, however, invariably begin suddenly; frequently the child has been suffering, apparently, from common cold in the head, and the attack of croup seems to be a consequence of the inflammatory affection of the membrane of the nose and throat, extending into the trachea and taking on the peculiar character of the more fatal disease. At other times there has been slight drowsiness for some days previously, but not sufficiently well marked to attract attention, although at the same time, from hoarseness not being common among children, its occurrence should always rouse suspicions, especially if the child itself, or any of the family, have suffered from croup. Sometimes a child will have a croupy cough for some nights in succession before the attack of the real formed disease, and parents are apt to be lulled into security by the fact that, in children susceptible of croup, any cough partakes more or less of the shrill croupy intonation.

The remedy, in incipient croup, is tartar emetic given in tolerably full doses, either in the form of solution in water, or rubbed up with sugar, but never as antimonial wine. The powder, one or two grains of sugar with the appropriate dose of the remedy, is the best form for keeping, as the solution decomposes and becomes inert, and the latter is perhaps the most quickly efficient form of administration. In a house which contains a child liable to croup, six or eight of the powders ought to be ready at all times, and also means for the local application of heat. To a child of two years of age, the eighth of a grain is to be given at once, to one of four years the sixth; and this dose is to be repeated every ten minutes or quarter of an hour, till full free vomiting is produced. At the same time a warm bath may be got ready, into which the child is to be immersed for a quarter of an hour, as soon as possible; or what will answer equally well, large poultices of linseed meal should be placed over the upper part of the chest and fore part of the throat, whilst the child is kept in a warm room. In the habitations of the poor, especially, the latter mode of treatment is certainly preferable to the bath, which cannot always be procured without delay, nor managed without danger of after-chill.

An hour after the vomiting, the dose of tartar emetic is to be repeated, and vomiting again excited, and its subsequent repetition at the end of one, two, three, or more hours, must depend upon the continuance and urgency of the symptoms, the poultices being continued. The child may be allowed to drink freely of toast or barley water, or thin gruel, but not tea—which decomposes the tartar emetic—unless the infusion is extremely weak. If a case of incipient croup be thus treated, it will, in all probability, be subdued without medical assistance, though it is certainly safer to have it; but if the fever is extremely high, and if the breathing has any approach to a crowing sound, medical attendance **must** be procured if possible and with the shortest possible delay. If, after tartar emetic has been used for four or five hours, the disease progresses, the frequency with which the remedy is given must now be diminished, and sickening doses given at longer intervals, otherwise there may be danger of depressing too much; but calomel must be begun, and to a child of two years of age, one-quarter of a grain is to be administered every four hours; the strength, if it seems to fail, should be supported with weak animal broth—that made from veal or fowl is the most suitable—given in small quantity and at short intervals. Should the exudation from the throat form into membrane, it ought to be touched with a solution of nitrate of silver of the strength of one drachm to the ounce of distilled water. This is best accomplished by a small sponge dipped in the solution, and applied to the glottis two or three times daily, but can only be attempted by a medical man. Later in the disease, when weakness increases, the strength of the broth must be increased, the tartar emetic entirely stopped, and solution of acetate of ammonia given instead, a teaspoonful every two or three hours to a child of three years old; or if symptoms of sinking, cold or blue surface, and weak pulse, seem to demand it, five to ten drops of sal volatile, or the same quantity of brandy, must be given in a little water, or the carbonate of ammonia resorted to; eight grains should be dissolved in an ounce and a half of water, and of this two teaspoonfuls given during one hour. A little white wine whey may also be given. Such must be the general outline of treatment to be pursued in a case of confirmed croup, should it have to be treated without the presence of a medical man; but again it is reiterated, the first twelve, nay the first eight hours, are the all-important period, which, if lost, can scarcely be recovered; for, though children do recover when the disease has advanced into its second stage, and even sometimes from such desperate circumstances as

to make it a duty never to despair of saving life, the chances are but small compared with those which the first few hours hold out, that period which in some situations **must** elapse before medical assistance can be procured, and which thus places the life of a child in the hands of a parent or guardian. If it is croup, even if it is suspected to be, let there be no temporizing, but let the treatment now laid down be promptly, actively, **unsparingly**, carried out. If the antimonials act strongly on the bowels, they should be checked with one or two drops of laudanum. In the last stage, to prevent death from suffocation, opening the windpipe holds out the last, and that but a faint hope of saving life. Of course a surgeon is required for its performance.

In case of diphtheria, the only sure and prompt remedy is the anti-toxin. See Diphtheria.

The causes of croup are almost invariably connected with cold and moisture, and particularly during east winds; but it may also be occasioned by the removal of wrappings from the throat, and exposure to a cool air, when a child is heated. Children liable to croup are still more so after attacks of acute or debilitating disease.

The prevention of croup is, of course, of the highest importance, and, therefore, the causes of it, just enumerated, must be avoided in every way; slight colds should never be neglected in children or families predisposed, but should be treated by confinement to the house, or to bed if requisite, by milk diet, diluent drinks, and by the tolu and mucilage cough mixture, with the addition of ipecacuanha wine; paregoric should also be given to allay troublesome cough, and, in fact, those measures recommended in **Cold** carried out. The susceptibility may also be lessened, by not clothing the throat too warmly, and by the regular practice of bathing the throat and chest well with cold water every morning, rubbing afterwards with a rough towel till thorough reaction ensues. This practice is, of course, better commenced in warm weather, and not too soon after an attack of the disease. Flannel should always be worn next the skin, and care taken particularly that bed chambers, and rooms children habitually live in, are not too warm, and never occupied whilst the floors are wet after washing. A residence at a distance from water is to be preferred.

Croup—Spasmodic, or Child-Crowing, is a kind of convulsive or spasmodic affection of the muscles of the larynx, which, by narrowing and closing the chink in that organ through which the air passes, occasions the sound of the breathing to resemble that of the true

inflammatory disease. This false croup is often an alarming, and sometimes a fatal disease; it generally occurs before the end of the third year of life, and in consequence of irritations acting more or less at a distance from the affected larynx, which receives the impressions through its nerves. Enlargement of the glands of the neck, affections such as eruptions of the scalp, the irritation of teething more especially, or the presence of irritating matter in the bowels, may any of them give rise to the affection. It comes on suddenly, the child is seized in a moment with "catching at the breath," struggles, the face changes color, and the veins are full; if the spasm be not relaxed, after a few ineffectual efforts at breathing, the child must die; but if the spasm gives way, the air is drawn into the chest with a crowing, croupy sound. It is of much importance that this spasmodic disease should be distinguished from real inflammatory croup, on account of the very different treatment required; it may be known by the absence of fever, and the stopping of breathing being much more instantaneous than that which occurs in the real disease. In an affection presenting symptoms so sudden and so alarming, **immediate** remedies must be used; a little cold water should be dashed on the face at once, and a sponge dipped in hot water applied to the fore-part of the throat; a few drops of ether or chloroform on a handkerchief and applied loosely over the face to allow of inhalation will often relieve the spasm, medical assistance being, of course, procured quickly. In this disease a child, even when apparently dead, might be saved by opening the windpipe. After one of these attacks has occurred the strictest examination as to the probable cause should be instituted by a medical man; the gums lanced if requisite, the bowels cleared with a purgative, and the glands of the neck specially observed, and if enlarged, the cause ascertained and removed.

Hoarseness and Aphonia, or Loss of Voice, may be owing to inflammatory swelling, either acute or chronic, or to ulceration of the lining membrane of the larynx, to paralysis, or to hysteria. Coming on suddenly, accompanied with fever, pain in the larynx and upper part of the throat increased on swallowing, and difficulty of breathing, the above symptom must be regarded with some apprehension, as one of the concomitants of rapidly fatal disease, acute laryngitis. Loss of voice, however, frequently occurs, quite unconnected with the other symptoms mentioned, and is then not to be so seriously regarded. Many persons are liable to it after exposure to night or foggy air, or after much, or loud talking. Persons living in damp houses suffer from this form of aphonia, which is probably owing to the thickening or great susceptibility of the laryngeal membrane. When it continues, nothing affords greater relief than croton oil, rubbed

over the forepart of the neck so as to produce a free eruption. Mustard plasters may be used, but are not so efficacious. A hot bran poultice to the throat at night, and a tea-spoonful of paregoric, taken along with twenty drops of ipecacuan wine, will often remove a threatened attack. Inhaling steam from hot water or spray from a spray-producer is sometimes of great service. In the more chronic form, twenty drops of tincture of squills may be substituted for the ipecacuan. A syrup made with infusion of horse-radish is popularly, and sometimes beneficially employed. Persons who are liable to loss of voice ought never to expose themselves unduly to damp, cold or night air, and should keep the feet well protected, not so much on account of the symptom itself, though that is troublesome enough, but because of the indication it affords of general delicacy of the bronchial membrane. When along with loss of voice there exists hoarse cough, pain, and expectoration of thick mucus, ulceration is to be suspected, and the case as soon as possible put under proper medical care. Aphonia from paralysis, or hysteria, comes under the general treatment of these diseases.

Loss of voice in **relaxed throat** is often quickly cured by brushing the back part of the throat over with a hair pencil, immersed in the following solution: Take of nitrate of silver or lunar caustic one scruple; nitrous ether one ounce, dissolve. Do not apply often, otherwise the caustic effect will be too severely produced. Those suffering from enlarged tonsils with elongation of the uvula, such as clergymen, schoolmasters and public speakers, or singers, will often derive benefit from this method of treatment properly applied. Relief has also been obtained as above in cases of that most distressing sore throat which often accompanies consumption. A little of the solution should be gently penciled over the back of the throat and allowed to trickle over the surrounding parts. Tannin lozenges often alleviate the difficulty experienced in speaking and swallowing. Red gum lozenges are also helpful. The patient must not talk, indeed, should not speak until the soreness is all gone.

Clergyman's sore throat is a peculiar affection of the throat and organs of voice to which public speakers are liable; actors, who have to assume feigned tones, are more liable to it from that cause. The commencement of the disease is insidious; it begins with an uneasy sensation, as if there was something in the throat which required to be hawked up or swallowed down; at the same time the mucous secretion is viscid. As the larynx becomes affected the voice is changed, becomes hoarse, unequal in tone, or quite lost; there may be slight pain about the parts, but not much cough in the earlier stage of the disease. All the symptoms become aggravated by cold, by vicissitudes of temperature, or by exertion of the voice in reading, speaking, etc. The above sources of aggravation are, of course, to be guarded against, and the general health attended to. Good diet, cold bathing, and change of air, with some astringent lotion for the throat, are generally sufficient to check an attack of clergyman's sore throat. If they do not suffice, it may be necessary to touch the parts with a pencil of lunar caustic, or what is better with a solution of nitrate of silver, by means of a sponge or small wad of absorbent cotton batting fixed to a slender wooden rod such as a pen-stock. The liability to the recurrence of the affection may be diminished by wearing the beard, and benefit is derived from the use of cayenne, tannic acid, red gum or other medicated lozenges. One of the best and simplest remedies is the inhalation of steam, either from an ordinary inhaler, or better, by means of

a spray producer, the spray being mixed with some astringent, such as nitrate of silver, sulphate of zinc, or alum.

A common cause is improper way of using the voice. The voice should be a "chest" and not a "throat" voice. The chin should be raised instead of lowered. Lawyers may talk much yet suffer little from throat disorder, because they talk up to the jury or judge. The clergyman talks down from the pulpit and does not give his voice a chance.

Breath.—The odor of the breath is a good index to the state of the body. A bad-smelling breath is usually from decayed teeth, or from a bad state of the tonsils; but more frequently, in children especially, it is indicative of disordered stomach, and of loaded bowels. The cause of the symptom should always be inquired into, and as far as possible remedied. A brisk purgative or a small dose of calomel ($\frac{1}{4}$ grain) may be all that is required. Disease of the lungs is sometimes accompanied with intolerably fetid breath.

Some persons suffer habitually from tainted breath; and many remedies have been proposed. The first thing to do is to **ascertain the cause** of this very disagreeable affection. If it is dependent upon carious teeth, the dentist should at once be consulted. The holes or cavities in decayed teeth become filled with particles of food, which rapidly undergo decomposition.

When foul breath is due to ulceration of the gums, whether connected or not with bad teeth, a medical man should be consulted, as also when there is ulceration about the palate or posterior part of the nostrils.

The following is an effectual wash for destroying the odor from conditions of the mouth, gums, or throat, giving rise to foul breath: Take of solution of permanganate of potash, one ounce. Fifteen drops of this, mixed with two or three table-spoonfuls of water, may be used frequently for rinsing the mouth. If the foul breath proceed from disordered conditions of the stomach or bowels, and be accompanied with an offensive odor of the evacuations, ten drop of the solution, mixed with two table-spoonfuls of water, may be swallowed twice a day, with the best effect. A good plan also, in cases of the latter kind, is to take five grains of powdered charcoal three times a day, either alone or with an equal quantity of white bismuth. Charcoal biscuits are prepared for this purpose, and may be had at most of the principal chemists. Animal charcoal is the most effectual. The breath has such an exceedingly bad odor in cases of mortification of the lungs, that it will be necessary to employ some of the means recommended under the head Disinfectants, in order to make the atmosphere of the room, or even of the house, in which the patient is situated, at all tolerable. The peculiar odor of the breath in patients who are undergoing what is called a course of mercury, is so characteristic as to have received the name among medical men of mercurial feter. In cases of bad breath caused by offensive discharge from the nose, the diluted solution recommended above, or some mild antiseptic solution, should be run into the nostrils. Tonics, cod liver oil and change of air are all helpful. Never use musk or any sort of perfume to hide a foul breath, but go to a doctor for advice and examination if the above remedies do not succeed.

Cold in the head, or coryza, is an inflammatory affection of the membrane lining the nostrils; it is accompanied with more or less fever. It commences with a sense of dry fulness or obstruction of one or both nostrils, which is quickly succeeded by watery discharge of an acrid character, and there is fre-

quent sneezing. The membrane of the eyes and their lids, being continuous with that of the nose, is also affected, and from a similar cause, extension of the irritation to the membrane lining the frontal sinus (or air-space in the lower part of the forehead) there is more or less headache. If simple cold in the head be not renewed, which it is extremely apt to be, it gradually subsides within the week; more generally, however, as it leaves the nostrils, it travels downwards into the lungs, and ends in catarrh, cough, etc. Coryza is a concomitant of some other diseases, such as measles and influenza.

From its tendency to recur, and also to produce and keep up irritation of the bronchial tubes, coryza is not only not to be neglected, but should be checked at first, if possible, and for this purpose various methods of treatment are recommended. A dose of opium either in the form of a large tea-spoonful of paregoric, or six or eight grains of Dover's powder, or quarter of a grain of morphia, when taken at bed-time, will often check a cold in the head at once; and the usual system of hot foot-baths, confinement to bed, low diet, and diluent drinks, along with diaphoretic medicines, such as spirit of mindererus, antimonial wine, etc., is certainly calculated to lessen the disorder, and may be followed with advantage.

It is the common practice to drink copiously of tea, gruel, or some other diluent drink during a cold; as long as this promotes perspiration, it is of some utility, and although it augments the flow from the pituitary or nasal membrane, it has the effect of diminishing its acrimony by dilution. It is the acrimony of this discharge which reacts on the membrane, keeps up the inflammation, and its accompanying disagreeable symptoms. On this circumstance depends the efficacy of a measure directly opposed to that just noticed, but to the success of which we can bear decided testimony—we mean **a total abstinence from liquids**. To those who have the resolution to bear the feelings of thirst for thirty-six or forty-eight hours, we can promise a pretty certain and complete riddance of their colds, and what is, perhaps, more important, a prevention of those coughs which commonly succeed to them. Nor is the suffering from thirst nearly so great as might be expected. This method of cure operates by diminishing the mass of fluid in the body to such a degree, that it will no longer supply the diseased secretion. Anything that will contribute to reduce the quantity of fluid in the body will assist in the plan of cure, and shorten the time necessary for it to take effect. It is, therefore, expedient to begin the treatment with an aperient, followed by a diaphoretic, as is usual, and this is the more necessary when any fever attends; but beyond this, no further care need be taken, and the individual can devote himself to his usual employments with much greater impunity than under the ordinary treatment. The coryza begins to be dried up about twelve hours after leaving off liquids: from that time the flowing to the eyes and fulness in the head become less and less troublesome, the secretion becomes thicker and between the thirtieth and the thirty-sixth hour ceases altogether: the whole period of abstinence need scarcely ever exceed forty-eight hours. It is then as well to return to the moderate use of liquids, as the first indulgence is apt to be excessive. It is not necessary to limit the solid food any more than to that which is plain and simple, except where there is an acceleration of the pulse, or gastric irritation, in which cases animal food should be proscribed. For the sake of comfort in mastication, the food should not be *the* driest kind. Thick puddings and vegetables, with or without meat, will be the best dinner; and toasted bread or biscuit, merely moistened with tea

or other liquid, for other meals. A single cup of tea is sufficient to bring back the coryza immediately, after twelve hours' abstinence has removed it. It will be said that this plan of cure is worse than the disease, and so it may be in some instances. It may be called always a choice of evils; but no one who is liable to severe colds, after once experiencing the amount of good and evil resulting from this method, would hesitate to follow this advice.

Good vaseline is an excellent remedy for a cold. Take a teaspoonful every two or three hours. Insert it in each nostril on the tip of the little finger and sniff it up the nose. Smear it freely on the bridge and sides of the nose externally. (See Nose-wash in Index.)

Catarrh is inflammatory irritation of the mucous membrane lining the air-passages—the nostrils and bronchi. It usually commences in the former, and extends to the latter. Catarrh, or “a cold,” as its popular name implies, is generally the result of cold combined with damp, but quite as frequently of checked perspiration, in consequence of passing from a heated room to a current of cold air. Catarrh commences with feverish symptoms more or less severe, shivering followed by heat. A peculiar dryness and heat of the lining membrane of the nostril, is followed by discharge of thin, acrid, watery fluid, “a running at the nose,” and with this, there is intense headache between the eyes. Or the throat may be first affected, or the chest itself may be directly attacked, though, if not, it will quickly become so; the windpipe feels as if raw, there is frequent cough, dry and harsh, or with thin expectoration, and the breathing is oppressed; there is, in fact, subacute bronchitis. Usually catarrh is due to repeated colds in the head.

The evil of a “neglected cold” has become proverbial, and justly so—it is great. The attack ought to be checked at once. The first measure is to restore, and excite the action of the skin to get free perspiration. This is best accomplished by the vapor or warm-bath, but if these cannot be had, the best remedies are hot water to the feet, a warm bed and hot diluent drinks, along with diaphoretic medicine. A draught consisting of half an ounce of spirit of mindererus, one to two drams of paregoric, and ten to fifteen drops of ipecacuanha wine, with water sufficient to fill a wine-glass, should be given with five grains of Plummer's pill, on getting into bed, and about an hour after, a warm drink composed either of gruel or barley water; in the morning, some gentle aperient, senna, or castor oil, or Seidlitz powder, is to be taken. If there is much irritation of the chest at night, a fomentation, a mustard plaster, or friction with a stimulant liniment may be employed. A pill composed of six grains of Dover's powder or a one-grain opium pill will often relieve the symptoms. Should the cold not disappear, the treatment above recommended may be followed up for two or three nights in succession, confinement to the house, low diet and demulcent drinks, such as barley water, etc., being super-added. When catarrh is not checked, it runs on to cough, in fact, to bronchitis, more or less severe.

Catarrh is unquestionably the effect in many cases of unavoidable atmospheric changes and influences, but it is much oftener the result of carelessness or imprudence—of carelessness in not guarding the body against the effects of our changeable climate, and particularly the neglect of wearing flannel or some woolen material next the skin, which is the very best preservative. Over-heated rooms and exposure to the air insufficiently clothed, are fertile sources of

catarrhal affection, especially in children. Insufficient protection to the feet and dampness is another. There is, too, in females, the exposure of the chest, after heated ball rooms, public amusements, etc. The use of fur round the neck is not infrequently the cause of cold affecting the throat: while close to the skin, it produces warmth and perspiration, but when the covering is thrown back, a chill at once ensues.

How to Avoid Catching Cold.—The microbe theory of disease has become a popular faith. Thousands of persons keep themselves and all about them in constant agitation in order to avoid the microbes which they imagine are the sole cause of consumption, pneumonia, influenza, and even common colds.

Of course it is true enough that various diseases are conveyed by the minute organisms known as microbes, or bacteria. Yet **knowledge of that fact does not save people from disease.** Indeed, it often directs their energies into a useless war with microbes and away from those practical precautions by which our ancestors, in utter ignorance of even the existence of such things, managed to keep good health.

The bearing of this aspect of the case has been well brought out by certain recent researches regarding the influence of exposure to cold in increasing the liability to disease.

A German biologist has found that rabbits infected with the pneumonia microbe developed that disease if exposed to cold, while the rabbits not exposed to cold threw off the infection and did not have pneumonia.

Another German biologist has found that the blood of rabbits and goats which were dipped in ice water showed a decrease of those organisms which devour the microbes of disease. By exposure to freezing cold the systems of these animals lost part of their natural defenders, and became more subject to invasion by harmful bacteria.

Furthermore, he found that **repeated exposures of such animals to slight degrees of cold increased the number of these defensive organisms in their blood.** By moderate and repeated exposure they were hardened against the attacks of disease.

The lesson to people who wish to avoid having pneumonia or influenza or catching cold is plain. It is: not to bother about microbes at all, but fall back on the common-sense methods which our ancestors, who never even dreamed of bacteria, derived from experience.

That is, to do just what they did: Keep the feet dry, avoid sitting in drafts when warm, etc., not bundle up too much in cold weather, and harden the body by reasonable use of cold water and cold air baths. Thus may you bid defiance to the microbe legions and avoid catching cold.

Cough is the violent expulsion of air from the lungs. It is usually a symptom rather than a disease itself. It may arise from a variety of causes, such as direct irritation of the air-tubes themselves by cold or damp air, or by irritant gases, or by foreign bodies such as a bread crumb, or by pressure of a tumor; or by irritation of the throat and fauces, particularly when there is relaxation of the uvula; and also in consequence of disease of the lungs themselves. Further, cough may be **sympathetic**, being really due to disorder in the stomach, or liver, or to irritation in the bowels occasioned by worms or other irritant agents, or it may be the result of nervous derangement such as hysteria, or be spasmodic, like whooping-cough. So numerous are the ailments and diseases

of which cough is a symptom, that it frequently requires considerable discrimination to determine the real cause. Many of the acting causes are trivial, but many are deeply seated and fatal diseases; and, therefore, whenever an individual has a cough, which cannot be readily accounted for by cold or some other direct cause, medical examination ought to be had. Even if the cough has been in the first instance the result of cold, should it continue "hanging about" a person, without obvious reason, medical advice ought to be taken; mischief may be brewing, and the cough may be due to some trivial and easily remedied cause, but may itself be causing disease in the lungs of a predisposed person.

Cough is dry or moist. A dry cough may be the result of direct temporary irritation of the air-passages, but more generally it is symptomatic either of incipient disease connected with the chest, or of sympathetic nervous irritation, probably connected with the abdominal viscera. Moist cough is generally connected with direct affections of the chest, such as common catarrh, and with inflammatory affections, or with asthma or consumption.

A cough should never be allowed to continue for any length of time without the cause being ascertained by medical examination; till this is done, the proper remedy can not surely be known. In the first instance, however, simple remedies may be tried. If the cough be clearly traceable to cold or catarrh, it may be treated according to the directions given under these heads; if it be very dry, demulcent medicines, such as the mucilage and tolu-mixture, or barley-water, or linseed tea, may be taken freely, with from five to ten drops of ipecacuanha wine two or three times a day, to which may be added fifteen or twenty drops of tincture of henbane to allay irritation. Opium and its preparations are not generally desirable in dry cough—unless, indeed, it be spasmodic—as the drug itself exerts a drying effect upon the mucous membrane of the lungs. The inhalation of steam from boiling water is sometimes highly beneficial. A tea-spoonful of Friar's Balsam should be added to a quart of boiling water and the steam inhaled. In dry, and also in moist cough, **counter-irritation**, by rubbing with hartshorn and oil, or turpentine or croton oil, on the front of the chest, or between the shoulders, is often of much service. Great benefit may be derived from a mustard poultice or a mustard leaf to the chest. The surface of the chest should be well protected by flannel next the skin, by a dressed hare skin, or by a warm plaster, either in front or behind. In moist coughs, the amount of fluids, and of demulcents, must be more restricted than in the above. The preparations of opium may be given in small quantity, either alone or in cough mixtures, but none answers better than paregoric, taken in one or two tea-spoonful doses in water; this allays the irritation and frequency of the cough, and to each dose, if expectoration is difficult, five or ten drops of ipecacuanha wine, and the same of tincture of squill may be added. The following pill is most useful in coughs depending upon irritation in the bronchi or air passage: Take of powdered opium five grains, of powdered squill sixteen grains, of powdered ipecacuanha twelve grains, of powdered camphor eighteen grains, of powdered gum ammoniac twenty-four grains, of powdered rhubarb twelve grains; make into a mass with syrup, and divide into thirty pills: of these, one or two may be taken for a dose.

The foregoing remarks apply only to chronic or continued cough; the treat-

ment of the affection in connection with other disease falls under the general management of these disorders.

Again, it is repeated, a cough ought not to be allowed to continue; if not relieved by some of the simple remedies mentioned above, medical advice should be sought, **particularly in the case of the aged**; if there is much secretion of phlegm or mucus, the least impediment to expectoration, in an old person, may rapidly induce dangerous or fatal embarrassment of the lungs, often most unexpectedly.

The possibility of a relaxed or **elongated uvula** being the cause of cough must not be forgotten; an examination of the throat will detect it, and the state may be relieved by the use of some astringent gargle, by a small fragment of catechu allowed to dissolve in the mouth, or by touching the uvula once or twice a day with a camel's hair brush dipped in a solution of perchloride of iron.

Bronchitis is inflammation of the membraue lining air-tubes or bronchi. It is one of the most common diseases; prevailing at all seasons, but especially in spring. It may be either acute, subacute, or chronic, and varies according to age. Acute bronchitis may commence directly in the chest after exposure to cold; but very often, particularly in children, the lining membranes of the eyelids, nostrils and throat are first affected, and the disease spreads downwards into the air passages of the chest. In the latter case, watering of the eyes, etc., precedes the actual bronchitic attack for a day or two. Acute bronchitis, as it occurs in the adult, is a severe disease, requiring the most prompt medical attendance; it is generally the result of exposure to cold in some way, but may be caused by irritant vapors. In it the fever is high, the breathing extremely oppressed, the cough frequent, and expectoration at first difficult. The disease terminates, either with the subsidence of these symptoms, the breathing and expectoration in particular, becoming easy; or respiration becomes more and more oppressed and difficult, the mucus which ought to be expectorated accumulates in the bronchial tubes, and the blood being unchanged, the lips and surface generally become blue and cold; delirium preceding death. The rapid progress which this disease sometimes makes, from its commencement to a fatal termination, renders the sending for medical assistance as quickly as possible an imperative duty; but the same reason renders it important that those around should be aware of the best method of treatment. Confinement to bed is a matter of course; but foot-baths, hot bran poultices to the chest, and warm diluent drinks, are all serviceable. The chief dependence is to be placed upon expectorant medicines, and ipecacuanha is the best and safest. Two tea-spoonfuls of the ipecacuanha wine should be given (or better, five-grain doses of the powder), either in milk or in some fluid, should be given in a little water every fifteen minutes, till free vomiting is produced; and this repeated after four or five hours. About an hour after the first vomiting, one grain of calomel is to be given, and if the disease continues severe, repeated in six or eight hours. In the event of symptoms of collapse, or sinking coming on before the arrival of medical assistance, it will be necessary to stop the nauseating treatment, and to give stimulants, such as five grains of carbonate of ammonia, in three table-spoonfuls of water, every half hour or hour; or a tea-spoonful of sal volatile may be given instead, in the same quantity of water, and at the same intervals. If these stimuli are not to be procured, the most readily obtainable alcoholic stimulant must be substituted; but ammonia is always preferable; the strength must at

the same time be sustained by table-spoonfuls of strong meat broth frequently given. When the urgency of the attack has been overcome, the severity of the treatment may be relaxed, and the following substituted: Three grains of ipecacuanha powder, a dram of carbonate of potash, and an ounce and a half of spirit of mindererus are to be made into an eight-ounce mixture with water; and of this two table-spoonfuls should be given every three or four hours. If the cough is very troublesome, three or four drops of laudanum may be added to some of the doses in the case of an adult—but this cautiously. The diet must be light and nourishing.

The acute bronchitis of children is not usually so rapid and strongly marked a disease as that just described; it often begins with the irritation of the membrane of the nose and eyes, and extends itself into the chest. Languor, succeeded by fever, oppressed and quickened respiration, and cough, are the usual symptoms. With these there is a dry hot skin, full and rapid pulse, and great increase in temperature. If these set in severely, from one to four leeches, according to the age of the child, may in an early stage of the disease be applied to the chest; but here, as in the adult, the chief dependence must be on ipecacuanha, half a grain to a grain, or more, frequently repeated so as to cause occasional vomiting. Poultices ought to be used to the chest. If the child is unweaned, it must not be allowed to suck, either from the breast or bottle, during a severe attack of bronchitis, but ought to be fed with the breast milk, or its usual food, by means of a spoon. The bowels, of course, will require attention. It is of the greatest importance to attend to the atmosphere surrounding either child or adult suffering from bronchitis: the chamber should be well ventilated, and the temperature not suffered to fall below 60° Fahr. A kettle should be employed to add moisture to the air of the room, and the warm bath may be occasionally employed, taking care that the child should be thoroughly dried before being put back in its cot. In the later stages of the complaint, the warm bath is not advisable. Bronchitis in children is so hazardous and frequently fatal a disease, that its domestic treatment ought never to be undertaken, except under necessity. Its exciting cause is almost invariably cold and moisture, particularly during the prevalence of east wind in the spring months; while careless and insufficient clothing among the poor, and absurd modes of dressing amid the higher classes, render children more susceptible of these injurious influences.

Chronic bronchitis, known also as winter-cough, catarrh, and often erroneously called influenza, is quite the commonest form of this chest affection, and assumes every condition, from the almost acute attack, to the cough which comes on with the cold weather, and lasts through the winter and spring. It may commence with irritation of the eyes, nostrils, throat, or trachea; the part affected feels sore and raw, and instead of its usual bland mucus, secretes a thin, somewhat acrid fluid; along with the local symptoms, there is more or less feverish disturbance of the system, and often severe frontal headache; cough is present, or not, at first, according to the part affected. If a threatened attack of bronchitis is to be checked, it must be done in the earliest stage, and for this purpose nothing is more efficacious than the hot-air bath, and in its absence, the employment of means to produce free perspiration, such as hot foot-baths, a hot bed, and the free use of warm diluent drinks. The most efficient medicine for the purpose of checking is opium, in small doses, and no better form can be found than that of English paregoric or compound tincture of camphor, one or

two tea-spoonfuls, along with a table-spoonful of solution of acetate of ammonia, and twenty drops either of ipecacuanha or antimonial wine, should be given at bedtime, along with sufficient water to fill a wine-glass. A tea-spoonful of spirit of sweet nitre may be substituted for the spirit of mindererus, or, for an adult, ten grains of Dover's powder and one grain of calomel may be taken on going to bed. An aperient should be taken in the morning. The above dose may be repeated for two or three nights in succession, if the disease is unchecked. In this case, of course, confinement to the house, or to bed, is required; and demulcent drinks—barley-water is the best—are to be freely used. There is seldom occasion for much medicine; for the alleviation of the cough, the following mixture will be found useful: Tolu syrup, one ounce and a half; thick mucilage of gum-arabic, one ounce and a half; ipecacuanha wine, one dram; water, sufficient to make up six ounces. Of this, a table-spoonful may be taken every four hours. If the cough is very troublesome, forty drops of laudanum may be added to the preceding mixture, and towards the end of the attack, a dram of tincture of squills in the above mixture.

Linseed meal or bran poultices to the throat and chest are of service at the commencement of subacute bronchitis; mustard plasters are not advisable when there is much fever or heat of skin, but a small blister to the upper part of the chest will frequently stop the further progress of the malady. In the attacks, the diet ought to be reduced, and meat and stimuli avoided while they last. An attack of subacute bronchitis ought never, if it possibly can be avoided, be allowed to establish itself for any length of time; consumption, asthma, and other chest affections are too nearly allied to it, and too often the seeds of fatal disease, which otherwise might have lain dormant for years, are quickened into activity by the neglected cold.

Inflammation of the Lungs.—The lungs and bronchi are liable to three distinct forms of inflammation—**bronchitis**, or inflammation of the bronchi, or air tubes; **pneumonia**, or inflammation of the tissue or substance of the lungs; and **pleurisy**, or inflammation of the pleura, or covering membrane of the lungs. Bronchitis has been fully discussed elsewhere. These three distinct inflammations of the lungs are not always distinctly separated practically. Bronchitis merges into pneumonia, and always accompanies the latter disease, while, on the other hand, pneumonia is often connected with pleurisy.

The inflammatory affections of the lungs are all characterized by general symptoms of fever, heat, thirst and quick pulse, by more or less embarrassment of breathing, and by tendency to cough. In pneumonia and pleurisy there is generally pain in the side, or under the breast, more or less severe, but sometimes this symptom is entirely absent. The distinctive characters of bronchitis have been pointed out. Those of pneumonia are marked by a greater amount of fever, and especially a higher temperature than in the other forms; generally the pain is less acute, but there is more cough than in pleurisy. It is, however, in the expectoration of pneumonia that one marked distinction is found. Shortly after the attack commences, the mucus coughed up becomes of a remarkably glairy, adhesive character, so tenacious as to adhere firmly to the bottom of the spittoon, at first uncolored, but soon acquiring a yellow tinge, and at length is streaked throughout with blood, which gives it a peculiar **rusty** or **plum-juice** hue. When, then, in an inflammatory chest affection, the expectoration is characterized as above, and goes through these changes, it may be considered that pneumonia is

present. The fever and other symptoms, as a rule, go down on the third, fifth or seventh day and the patient improves rapidly. Pneumonia is due to a spinal germ, the *pneumococcus*. It is often present in the mouth and throat of healthy people, and is harmless so long as their general health is good. Cold or damp has the peculiar effect often of making the germ very virulent. The sputum of a pneumonia patient is full of these germs and should be disinfected (see Disinfectants). Pneumonia, in other words, is "catching."

In pleurisy, the pain in the side is frequently severe, of a peculiar, sharp, cutting character (compared often to a stitch), which is aggravated at every respiration, and prevents the proper expansion of the chest; it is, too, aggravated by all attempts to lie on the affected side, and by the cough, which is short and dry.

An attack of *pneumonia* (inflammation of the substance of the lungs) tends to terminate either in the return of the lung to its ordinary healthy condition, in its becoming solidified (or as medical men call it "hepatised," that is, converted into a mass as solid as a piece of liver) or in the formation of abscess in the lung. In either of the latter cases, the result is, of course, impairment of the functions of a vital organ, which is felt by the whole constitution, and which occasions more or less distress, locally, according to the amount of lung damaged. The condition, moreover, often lays the foundation of future disease. More rarely pneumonia terminates in mortification. An attack of pleurisy tends to terminate in return to health; in the effusion of water or of matter into the cavity of the chest, and in the formation of adhesions between the smooth surfaces of the lungs and those of the chest with which they lie in contact. If the water or matter formed in the chest is of large amount, as it must find room, it compresses the spongy substance of the lung to so great a degree that no air can enter, and thus, as may be imagined, causes great distress in breathing. When this occurs, the sharp cutting pain, which was partly the result of the inflamed surfaces rubbing against each other, subsides, for the surfaces are now separated, and the patient, instead of lying on the back, or on the other side, now inclines to the one affected, as, by doing so, he throws the weight of the fluid off the sound lung.

Pneumonia occurs, of course, in every degree of severity, and frequently proves fatal; generally the result of cold, but also at times arises from violence or other causes; moreover, it is a disease which often occurs suddenly, and with much severity, in situations at a distance from medical aid. When such is the case, much assistance may be given by the well-directed efforts of the unprofessional. Confinement to bed, low diet, a plentiful supply of diluent drinks to quench the urgent thirst, and hot poultices of bran or other material to the affected side, are the first necessary measures. If the bowels are confined, they should be acted upon moderately, but no good can be derived by strong purging in the disease in question, and by it the strength of the patient will only be unnecessarily depressed. The propriety of bleeding from the arm in inflammations of the lungs is much questioned, and, except by medical sanction, the operation will be better let alone in unprofessional hands, even if it can be performed.

Treatment.—Good nursing and careful diet are the chief needs. The great danger is exhaustion of the heart, as it has increased work owing to the obstruction of the circulation through the lungs. For this reason pneumonia is very fatal in old people (whose hearts have little reserve force) and is hence termed "the old people's friend"—it very often relieves them of all their troubles.

The patient should be lightly clothed (a thin flannel night gown) and have

light bed covering. The room must be airy and light. The patient's mouth and gums should be kept clean.

Drugs have little or no effect on pneumonia. *Veratrum viride* tincture may be given in doses of 2 to 5 drops in water every 2 hours. For the stitch in the side, $\frac{1}{4}$ grain of morphia may be given, or 5-grain doses of Dover's powder not oftener than every 4 hours, according to the pain and cough. Hot poultices (for children) or cold applications are also good to relieve the pain. An ice bag, or ice poultice, to the affected side is good to keep down fever and to protect the heart against exhaustion. The skin should be kept dry by oiled silk or sheet rubber or oilcloth. Sponging the whole body, part by part, with tepid water is also excellent every 3 or 4 hours, especially for nervousness and high temperature. The bowels should be kept gently open with calomel— $\frac{1}{4}$ grain—given either with or without the opium (or Dover's powder). In pleurisy, the chief modification of the above treatment ought to be the use of moderate doses of some saline, such as nitrate of potash, in 10-grain doses, every 4 or 5 hours, and the calomel and opium may be given at rather shorter intervals. It is seldom that an attack of inflammation of the lungs will run its entire course without being visited by a medical man; but should it of necessity do so, under unprofessional care, the best procedure will be, when the disease subsides, to do as little as possible in the way of medicine, beyond attending to the action of the bowels, and, if requisite, of the kidneys by some safe diuretic; if cough is troublesome, it may be allayed by a few drops of laudanum, or by paregoric, in some demulcent, such as barley-water. The patient should be nursed gently and cautiously into health.

Hay Asthma, or Hay Fever, is one of the most troublesome of diseases; one, too, which varies extremely in its severity, presenting in one person the symptoms of an aggravated common cold, and in another, in addition to these, the disagreeable and alarming accompaniment of spasmodic asthma. It is caused by the pollen (or fertilizing dust) of certain flowering grasses, plants and trees. Golden rod (or "yellow weed"), rag-weed, timothy, certain substances such as ipecac powder or the fine dust from feathers, are the commonest causes. A sufferer is usually affected by some one cause, and he also has a susceptibility of the nervous system to the disorder. A sufferer from this troublesome complaint is indeed entitled to sympathy. His head aches, his eyes are suffused, he sneezes violently, and there is an acrid and profuse discharge from the nose, with harassing cough. Attacks of spasmodic asthma follow, accompanied, it may be, with great difficulty of breathing, and a sense of impending suffocation. There is nothing for it in such a case but to remove from the cause of the disorder, otherwise it may run on for a month or more. A change to the seaside is often attended with beneficial results.

The treatment of the disease must be naturally divided into that required during an attack, and that which it is desirable to employ in order to render the system less liable to the disease. During a paroxysm, a simple and efficacious remedy is the smoking of tobacco, which generally gives relief, if continued till slight nausea comes on. Such is the relief to the breathing in some cases that the patient has been known to fall asleep with the pipe in his mouth, so great had been the previous exhaustion from the struggle for breath. The inhalation of the vapor of creosote, and the use of antispasmodics generally (as ether, lobelia, with the compound tincture of camphor) should be used; or the vapor of camphor may be inhaled by means of a spray-producer. As the disease is generally in

duced by particles of pollen from the grasses during the season of haymaking, those who are liable to attacks should wear a respirator composed of cotton, wool or other impervious material during this period. While free from attack, the constitution of the patient should be strengthened by a liberal use of tonics, specially iron, strychnine, arsenic and quinine, either alone or in combination.

Asthma may run in families, affects men more than women, and may last a lifetime. A patient may be free of it in the city and always suffer from it whenever he goes into the country, or a special part of it. An attack may be brought on by the odor of animals (horse, dog, cat), flowers, hay or by dust, or by fright or by certain foods or too much food; often by nose trouble. It is a nervous affection and attacks may be caused directly by irritation of the lining of the bronchial tubes, or indirectly ("reflexly") by disturbances of the stomach, intestines or genital organs.

Symptoms.—Chilly feeling, tightness in the chest, flatulence, passing large amounts of urine, or depression of spirits may precede an attack, which usually occurs at night. The patient wakes up with a distressing sense of lack of air and of oppression in his chest. The breathing becomes very labored, the face is pale and anxious, speech is impossible, and little air enters the lungs in spite of great efforts to breathe. Expiration is prolonged and wheezy, but the rate of breathing is normal. The attack lasts from a few minutes to several hours. The face becomes wet with sweat, the hands and feet cold, but just as the distress seems to be greatest relief comes, often with a fit of coughing, and the patient sinks asleep, exhausted. A second attack may soon follow. The cough at first is tight and dry. The **sputum** is peculiar in asthma, containing little, round, jelly-like, clear or opaque, spiral masses. Attacks may recur for 3 or 4 nights, with cough and wheezing in the intervals; the patient is usually well mornings. It is not a dangerous disorder in itself, but may lead to disease of the heart and lungs.

Treatment should be immediate and prompt. A few whiffs of chloroform is good; pilocarpin often helps, or 2 to 5 drops of amyl nitrite on a handkerchief, inhaled, may give rapid relief. Strong stimulants given hot or a dose of spirits of chloroform in hot whisky will give relief. Belladonna, herbane, stramonium or lokelia may be used internally in solution or in cigarettes, or tobacco smoke may be inhaled. Paper should be dipped in a solution of nitrate of potash, allowed to dry and then burned to fill the bedroom with smoke. This is good to prevent an attack. Or 10 to 20 grains of potassium iodide in half a glass of water three times a day will often prevent attacks. The syrup of hydriodic acid, made by a reliable manufacturer, is even

better than potassium iodide, either as a preventive or as a cure for asthma. The diet must be well regulated. The heavy meal should come early in the day and digestion should be complete before going to bed. Starch and sweet dishes must be avoided. Coffee is better than tea. Climate is important. High, dry places are best, but the patient must be guided by his own experience in the choice of a remedy, as the results differ so much in different individuals. Cold and wet must be avoided, also damp feet, damp rooms, sudden changes in the atmosphere and excesses of any kind. The action of the skin and bowels should be well regulated.

*Subject Reference.—For Care of Teeth, see Vol. 1, p. 46, 120-126
Baby's Teeth, Vol. 1, p. 595-597.
Children's Teeth, Vol. 1, p. 125.
Toothache, see Vol. 2, page 157,
and Prescription for, page 617.*

INSTRUCTION FORTY-THREE—*Teeth*

The Teeth

One Sore Tooth May Throw the Entire Mouth Out of Service

Toothache.—Probably no single ailment of the human body is a more common cause of intense suffering than toothache. Yet, common as it is, it is seldom understood except by the dentist and so is not usually properly treated outside of a dentist's office.

There are several kinds of toothache and the same treatment is not good for all alike—what is good for one may be very bad for another. The various kinds, their recognition and appropriate treatment are here described.

It is well known that teeth are subject to decay, by which holes or cavities form in the solid part of the tooth and may cause an opening right into the pulp, exposing it. Toothache, however, may occur without the pulp being exposed.

I. Simple or Primary Toothache.—The pulp is not exposed, but a cavity in the tooth has a thin floor which leaves the pulp liable to irritation by cold air, hot or cold liquids, or by substances that readily take up water (so-called "hygroscopic" substances). Thus breathing cold air, drinking hot tea or soup or cold water, or eating candy, sugar, syrup or cake will cause this form of toothache.

Remedies.—Washout the mouth and the cavity in the tooth by taking lukewarm water in the mouth and forcing it back and forth between the teeth with the tongue and cheeks while the lips are closed. Do this repeatedly, and with a blunt toothpick scrape the cavity in the tooth. Then plug the cavity with a little ball of cotton-batting moistened with oil of cloves, creosote, carbolic acid, laudanum, or camphorated oil. This is done by taking a piece of cotton, rolling it between the fingers, fixing it on the end of a sharpened match or on a toothpick, dipping it in the liquid to be used (then touching it to a clean handkerchief to remove the excess of the liquid), and then packing it in the cavity. "Toothache gum" or a small roll of tobacco will do instead of the above. Carbolic acid should not be used very long in a tooth, because it softens the tooth and enlarges the cavity. Oil of cloves will not do so and is quite as good to use in a cavity.

II. Complicated or Secondary Toothache.—There are several varieties of this:

A.—There is a cavity, the pulp is not exposed, but there is a small abscess

under the thin floor of the cavity. The toothache is throbbing, and is the worst there is; it is very hard to relieve, and the following directions must be carefully and faithfully followed.

Remedy.—The abscess must be opened. This is done with a fine needle from which the temper has been drawn by holding it in the flame of a match till red.

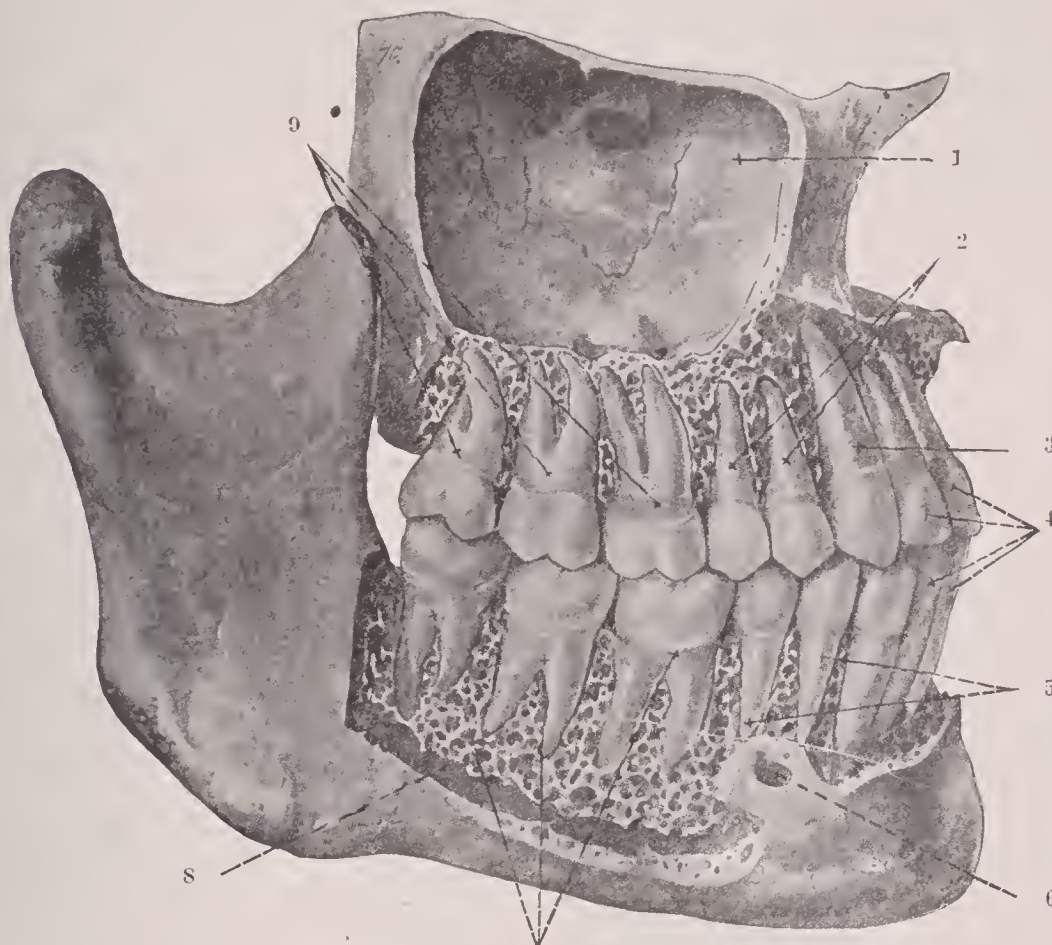


Fig. 311.

The permanent teeth. The bone has been chiselled away to show the roots of the teeth.

1. The maxillary sinus or hollow in the upper jaw-bone (beneath the eye); it has a small opening into the nose and may be included in a cold in the head, sometimes filling up with mucus or with pus and causing severe neuralgic pain; it must then be opened into by a doctor.
2. Upper premolar (or bicuspid) teeth.
3. Upper canine tooth.
4. Incisors or cutting teeth.
5. Lower premolar (or bicuspid) teeth.
6. Mental (or chin) opening in the lower jaw-bone.
7. Lower molars.
8. Canal in which runs the nerve to the lower teeth, to each of which a branch goes up from the main nerve lying in this canal.
9. Upper molars.

Feel or gently scrape in the bottom of the cavity with the needle till blood comes. This gives instant relief which lasts a minute or two and is followed by severe pain for another minute or two, and then the tooth is better—gives no further pain. Hours, or even days and weeks of severe pain, will be prevented by this treatment. After opening the abscess, proceed as in the case of simple toothache—that is, cleanse the cavity, soothe and protect the pulp.

B.—There is a cavity and the pulp is exposed, allowing mechanical pressure directly on the pulp, as by impacted food, a berry seed, etc. Biting on bread is a common cause, but biting on meat does not have the same effect. The bread packs into the cavity and continues to do so.

Remedy.—The same treatment as for A will relieve.

C.—The pulp is dead or dying (dead above and alive below); there is a cavity opening into the pulp-cavity, but it is plugged up and the gases generated from the decaying pulp are pent up and cause pressure on the nerve below.

1. The pulp is dying. Treat like A above, opening the pulp cavity to allow the gas to escape, cleansing, soothing and putting in an antiseptic to prevent more gas forming.

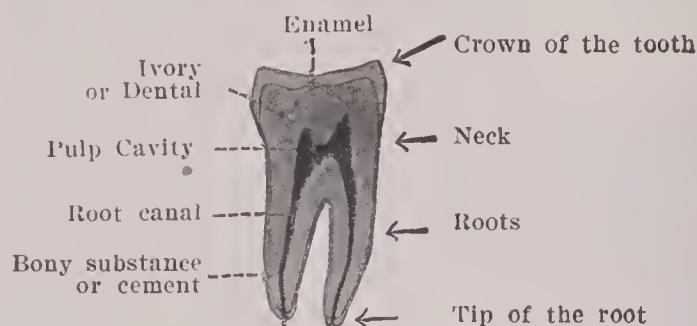


Fig. 312.

The structure of a tooth as exemplified by a cut through a lower molar.

2. If there is no relief yet, the pulp is likely dead all the way to the root-tip. Remove the packing of cotton. See that the opening into the pulp-cavity is surely free and by suction empty the cavity—that is, suck the tooth. Do not plug the cavity again. If the toothache recurs, the opening has become plugged up by the dead pulp oozing up. Use the needle again to open it. An old root of a tooth of which the crown is all gone may give much trouble just in this way. The canal in the root becomes filled with food which packs down through the root on to the nerve beneath. Relief will be got by **searching the end of the root with a needle** until an opening is made and then sucking it strongly until relieved.

D.—The pulp is dead, and there may be a cavity or not. The root-membrane becomes inflamed (**pericementitis**, so-called), causing pain. The swelling under the tooth heaves it up a little and the tooth seems to be very much elongated—“seems about an inch long,” the patient often says. This is certain proof that the condition present is what has just been described.

Remedies.—If there is a cavity, do not plug it but thoroughly empty it by suction. Take a **hot foot-bath** and a big drink of **hot lemonade**, and cover up warm in bed. **Take no alcohol**, or you will make the trouble much worse. Take ten grains of “Dover’s powder” and half a grain of calomel and soda on going to bed. This will ensure a night’s rest. On rising in the morning **take a full dose of Epsom salts** (a heaping tablespoonful) or of Rochelle salts in a glass of tepid water—**first thing on rising and at least an hour before eating any breakfast**. This alone (that is, the Epsom salts) will often be all that is necessary to effect a cure.

If it is not bad enough to make going to bed worth while, the following will be effective: Dissolve a dram (sixty grains or a teaspoonful) of soda salicylate in an ounce of water; take a teaspoonful of the solution at a dose. The dose

is to be repeated at longer and longer intervals as follows: Take eight doses at intervals of ten, twenty, thirty, forty, fifty, sixty and seventy minutes—the interval between the seventh and the eighth doses is seventy minutes.

In conjunction with the above, it may be necessary to use other measures, such as counter-irritation; rub raw mustard (or red pepper or pepper seeds tied up in a piece of muslin) on the gum over the aching tooth and leave it on until it burns pretty freely. The mouth may then be washed out with lukewarm water.

An ice or cold water application may be used soon after the ache begins, but

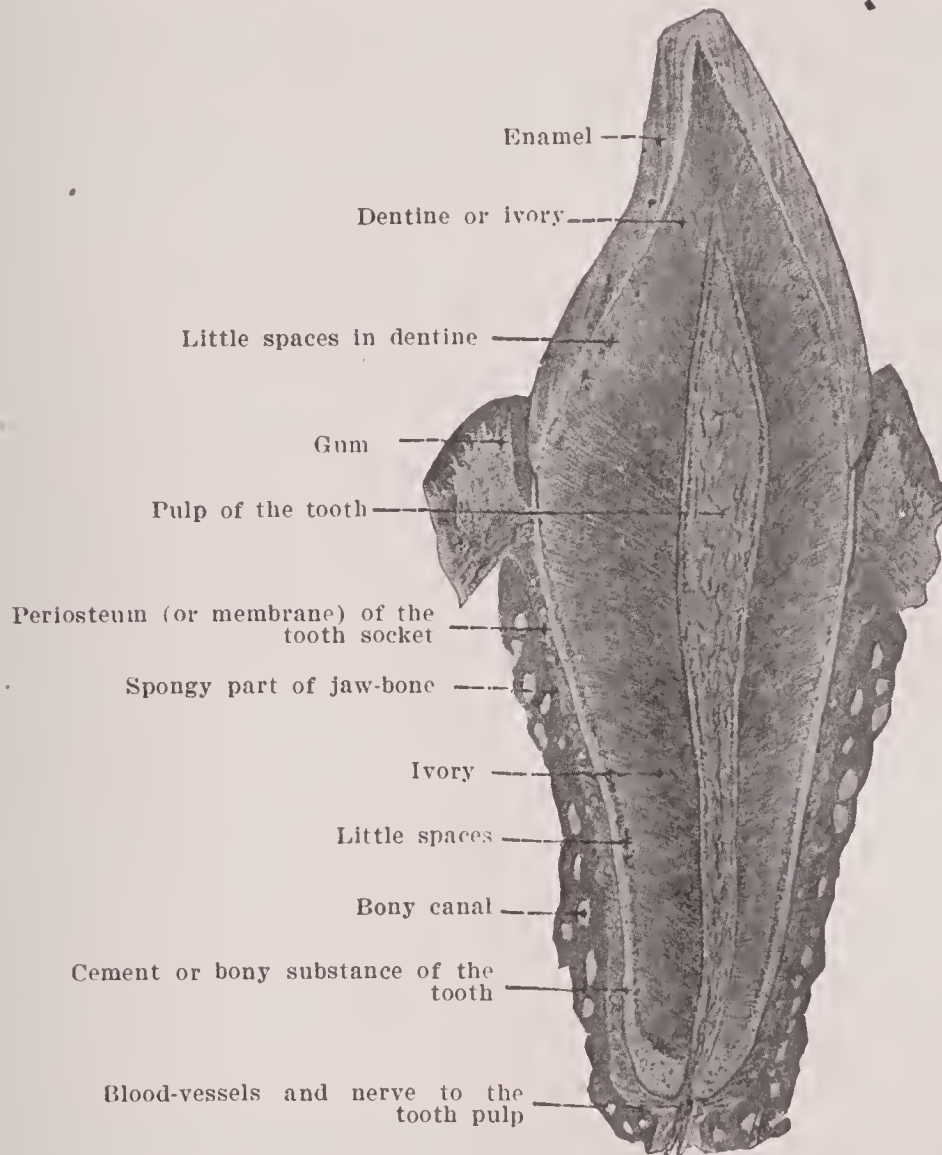


Fig. 313.

A cut through an incisor tooth to show its interior and surroundings.

not after it has been going some time. It must be cold and kept cold, either by ice or by letting cold water run on the cheek. Warm water will not do. A hot or lukewarm poultice or any hot application is only and absolutely harmful in this form of toothache, and if used and persisted in will certainly lead to serious extension of the inflammation and to the formation of an abscess.

When the inflammation is not checked, as by some of the foregoing methods, it goes on to the formation of an abscess, and even before this the face swells,

often to a remarkable size. Heat may give a little lessening of the pain if applied, but is **sure to make matters worse** sooner or later. The **only** external application which is of any use or at all permissible in this toothache—popularly known as “ulcerated tooth”—is a mixture of equal parts of lead and laudanum. Sugar of lead (which is lead acetate) is dissolved in water to saturation (all that will dissolve), and to one ounce of this is added an ounce of laudanum; fold a piece of linen or cotton 6 by 3 inches into a six-ply pad 2 to 2½ inches in size; saturate this pad with the lead and laudanum mixture and apply it on the cheek over the tooth, keeping it in place with a handkerchief; keep it wet by tipping the bottle of the mixture against it from time to time. This may be kept up for hours and will do **nothing but good** all the time. **It is always safe to use this application on a face swollen with toothache.** Hot water or hot salt are always bad in such cases, because the heat causes the abscess to come out to the skin and it opens there and causes an unsightly sore and a scar after it has healed up. It is apt also to cause extensive sinuses or canals to form about the jaw and even down into the neck. The abscess may be made to “point” (or come to the surface) **on the gum** as follows: Paint the gum over the root of the aching tooth, with either tincture of iodin or with a mixture of equal parts of the tinctures of iodin and aconite, or with chloroform. Or, as none of these may be at hand, **apply heat to the gum** by means of a roasted raisin or fig split and capped down over the tooth; or use a wedge of an under-done fresh-baked sour apple placed between the tooth and the cheek. Any of these will cause the abscess to point much quicker than if left to itself. As soon as it is open there is relief from the pain and the swelling soon begins to go down.

Prevention of Toothache.—If you are subject to toothache, you should **avoid damp**, especially damp feet; also **avoid exposure to severe cold**. Keep the bowels regular and avoid excesses of any kind. If the teeth are in any way defective, a dentist should be consulted and necessary repairs made at once. “A stitch in time” here will save a lot of trouble.

A form of decay to which the teeth are subject is the so-called “cervical decay” which occurs just below or at the margin of the gum, especially on the front teeth. The enamel naturally thins away on the neck of the tooth (where the crown joins the root) and leaves the tooth weak against decay about the neck of it. It is painful to touch the decayed spot and usually a dental filling has to be deferred until the cavity has reached a considerable size. The nightly application of milk of magnesia or of a chalk tooth powder will keep the necks of the teeth in good order.

Referred Pain Due to Teeth.—It is a curious and very important fact that disease in a tooth may cause no symptoms directing attention to that particular tooth or even perhaps to the teeth at all. It may, however, **cause pain elsewhere** in some part that is not diseased, as in another tooth. Thus, pain may be “referred” as follows:

1. From an upper diseased tooth to the corresponding sound lower one.
2. From a diseased wisdom tooth to any sound tooth in front of it up to the middle of the arch or row, that is, the pain is always on the same side as the diseased tooth.
3. From a diseased wisdom tooth the pain may be referred to the back of the head, back of the ear, or even quite remotely, as in the arm or shoulder.

INSTRUCTION FORTY-FOUR—*The Stomach*

Diseases of the Stomach

ACUTE GASTRITIS—Simple Gastritis, Acute Gastric Catarrh, Acute Dyspepsia, Acute Indigestion.

CHRONIC GASTRITIS—Chronic Catarrh of the Stomach, Chronic Dyspepsia.

GASTRIC ULCER—Ulcer of the Stomach.

Cancer of the Stomach, Dilation of the Stomach, Nervous Pain in the Stomach, Nausea, Vomiting.

NOTE: Thirty per cent of All Cancers in Men and Twenty-One per cent in Women are in the Stomach.

1. *Acute Gastritis.*

(Simple Gastritis, Acute Gastric Catarrh, Acute Dyspepsia, Acute Indigestion.)

Gastritis is inflammation of the stomach.

Causes.—It occurs at all ages and is a very common complaint. It is usually due to errors of diet. Too much food, unsuitable foods, which remain undigested and decompose in the stomach and so irritate it; food which has begun to decompose before use; and the abuse of alcohol, are the common causes. It occurs also at the beginning of most fevers. Some people are much more subject to it than others, hence we speak of a "weak or delicate" stomach and of a "strong" stomach. Exposure to cold is a very probable cause in connection with some irritation of the stomach.

Symptoms.—In a mild case there is slight "indigestion"—discomfort in the abdomen, headache, depressed feelings, nausea, belching, and finally, vomiting, which usually gives more or less relief. Children may have intestinal symptoms as well as the preceding, namely, colicky pains and diarrhea. In a severer case there may be a chill at the beginning with fever later, rising to 102° or so. The tongue is furred, the breath is heavy, and there is frequent vomiting. The vomit at first has food in it, but later there is much mucus or slime and bile. Constipation may be present, but more often there is diarrhea. The urine is high colored and becomes turbid on standing. The abdomen may be distended and there is usually tenderness on pressure on the stomach. The lips may be sore (herpes). The attack lasts one, two, three days, or even longer.

Ordinary attacks are easily recognized, especially when there is an apparent cause, but it is often difficult at first to say whether it is the beginning of a fever or not.

Treatment.—Mild cases in children require a dose of castor oil. This is excellent for adults also, or they may take calomel in divided doses—1/5 of a grain every half hour for six doses, followed by a dose of salts or a Seidlitz powder. These mild cases will recover of themselves if the patient takes no food and keeps quiet for the day. In a severe case the vomiting should be

Subject Reference

See Vol. 1, page 47-48 for Size, Shape and Functions of the Stomach.

For Digestive Action, pages 109-116.

For Washing Out the Stomach, page 503.

See Vol. 2, Surgical Affections, page 194; Prescriptions, Acidity or Sour Stomach, page 601.

"Chlorodyne" page 606, also see page 620.

encouraged by giving the patient warm water to drink. For the belching of gas, give soda bicarbonate (baking soda), a half teaspoonful in water. The bowels should also be well cleared out by calomel and salts. The stomach must have complete rest—no food for a day or two. The patient may have soda water and ice to allay the thirst. The vomiting should not be checked unless it lasts too long or is very severe. The patient usually recovers quickly and completely.

II. CHRONIC GASTRITIS.

(Chronic Catarrh of the Stomach, Chronic Dyspepsia.)

In this disease there are disturbed digestion, increased formation of mucus, changes in the amount and quality of the gastric juice, weakening of the muscle-coats of the stomach, so that the food stays a long time in the stomach—too long a time; finally, the lining of the stomach becomes altered in its structure.

Causes.—The causes are classed as follows: 1. **The Diet**—Unsuitable or improperly prepared food; the continued use of certain articles of food, such as very fat foods or too much starchy food; “New England” pie and hot breads; excess of tea and coffee and, above all other liquids, alcohol; irregular hours of eating, eating too quickly or not chewing the food properly; drinking too freely of ice water during meals is a cause of the great frequency of dyspepsia in the United States; the use of tobacco, especially the chewing of tobacco. 2. **Constitutional causes**, such as anemia, chronic tuberculosis, gout, diabetes, and chronic Bright’s disease. 3. **Local conditions of the stomach itself**, as cancer, ulcer, dilatation; or, of the portal circulation (through the liver), causing engorgement of the lining of the stomach; this may be due to liver disease, heart disease or lung disease, any of which may interfere with the passage of the blood through the liver and so dam it back on the stomach. In America, excess in eating is a more common cause than excess of drinking.

Symptoms.—This is a disease which lasts a long time and of which the symptoms change as the disease progresses. The appetite is variable, being good at times, and at other times poor. An early symptom is distress or oppression after eating, which may increase till it is painful. There may also be painful feelings when the stomach is empty. The pain differs in different cases, both in place and in character. It may be very trifling or very severe. When it is situated in the “pit of the stomach”—just below the breast-bone—or in front of the heart, it is known as “heart-burn,” or sometimes as cardialgia. Pressure on the stomach causes pain which is not very severe and is not greater at one place than another. The tongue is coated and there is a bad taste in the mouth. The tip and edges of the tongue are often red, and with this there may be an increase in the amount of the saliva. Nausea is an early symptom; it occurs in the morning especially. This may not be present, however, and is a more common symptom of cancer of the stomach. Eructation of gas, or “belching,” is a symptom in so-called “flatulent dyspepsia,” and the bowels may also be distended with gas. A bitter fluid may be brought up with the gas. The vomit contains food in various stages of digestion, together with mucus or slime. In the chronic dyspepsia of old toppers there is apt to be vomiting in the morning, bringing up a good deal of mucus. The food stays a long time in the stomach, which favors decomposition of it, with the formation of gases that distend the stomach and cause the walls of the stomach to become weak. There is

usually constipation, but there may be diarrhea, and then the food passes through rapidly and is not digested. The urine is often scant in amount, high-colored, and becomes cloudy on standing. Headache is common, the patient is always out of sorts, does not care for exertion and becomes low-spirited, and may become melancholic. Dizziness is sometimes a marked symptom. The pulse is small and usually slow, and there is apt to be palpitation of the heart. There is no fever. There may be a cough, due to irritation of the gullet or throat.

Treatment.—The cause must, if possible, be found out and removed. A dyspeptic should always be asked two questions—how much time does he take at his meals? How much does he eat? Most cases of indigestion come from either too hasty eating, the food being “bolted,” or too hearty eating. Many cases can be cured by having the patient count a certain number—twenty to forty or more, according to the severity of the case and the state of the teeth,—before swallowing each mouthful. Or he should “chew his food all away to nothing.” He should also think of the food and get as much taste out of it as he can; he must avoid using too much sugar or flavoring, which disguises the true and best taste; let him seek to become an expert on the taste and qualities of food. The second point is equally important—**people habitually eat too much.** Enough is not only as good as a feast: it is far better. All the food taken **over what is needed and can be properly digested** is so much borrowed trouble. Most people in America are careful as to how much they drink, few drink too much; but they more than make up for it in eating too great quantities. The art of cooking is a rare one and the stomach suffers much in consequence.

We shall consider treatment under two heads: 1, Diet; and 2, Medicine:

Diet.—A carefully and systematically chosen diet is always a first necessity, and is often all that is needed to effect a cure. It is impossible to lay down rules for all cases. People differ so much in their ability to digest different foods that there is a great deal of truth in the old adage: “What is one man’s food is another man’s poison”; or, as it is sometimes put: “One man’s meat is another man’s poison.” In the mild cases the patient’s preferences may be regarded in selecting the diet, and, as a general rule, what is much liked is easiest digested. This is, of course, not always true. A strict milk diet should be tried in obstinate cases, especially if the patient can take milk well. Some people dislike it and it does not always agree in such. If the milk is not well borne it may be diluted with one-third soda-water or one-sixth of a teaspoonful of baking soda may be added to each tumblerful, or a pinch of salt. Skim-milk may agree better than the whole milk, or milk with cream. Buttermilk is often excellent, but cannot be taken for very long, as a rule. The milk must be given at fixed hours and in regular amounts of, say, a tumblerful (six to eight ounces) every three hours. At least three to five pints should be given in the twenty-four hours. Milk is not well borne when the stomach is dilated. The patient’s stools should be watched and if milk curds appear in them the patient should have eggs, dry toast or biscuits as well as the milk.

In many cases it is only necessary to cut off certain articles. Thus, if there are acid eructations (or bitter fluids raised from the stomach) and flatulence, the farinaceous or starchy foods should be cut down or altogether avoided, especially potatoes and coarse vegetables. Hot bread is a very common cause of indigestion among Americans. It and pancakes, pies, tarts, heavy pastry, and all fried things, should be most strictly avoided. Contrary to popular opinion, white bread

is more easily digested than whole meal bread, especially if it is toasted. There are, however, exceptions to this, and some people digest Graham or whole-wheat bread better. Chronic dyspeptics should avoid or take very little of sugar or any very sweet articles of food. Ice-cream, if eaten in too great quantities—as it commonly is—will and does cause severe indigestion. “One of the most powerful enemies of the American stomach in the present day is the soda-water fountain, which has usurped so important a place in the drugstore.” (Osler.)

A moderate amount of good butter is allowable. All other fats, very fat meat, and thick, greasy soups, are to be avoided. Bananas do not, as a rule, agree. Ripe fruits, especially if cooked, are beneficial in moderate quantities. Many people have a yearly attack of indigestion and sore throat from strawberries. It is a curious fact, however, that what causes one dyspeptic great suffering will agree quite well with another. The general hygiene is very important in the treatment of indigestion. Dyspeptics are very apt to be moody and to brood over their troubles and to become despondent. Their fears should not be made too light of, but an effort should be made to gain their confidence in being cured. Systematic exercise, combined with a proper and restricted diet, is especially beneficial. A stay at a watering place is often of value in that the patient learns how to take right care of himself, or herself, for many women are dyspeptics. The most obstinate case of dyspepsia may usually be cured by change of air and occupation, or a prolonged sea voyage, or a summer spent in the mountains.

Medicinal.—The functions of the stomach may be stimulated by certain drugs, or the digestive secretions may be supplemented by artificial preparations. The bitter tonics, “bitters” in the proper sense, such as quassia gentian, calumba, condurango, ipecacuhana, strychnia and cardamoms, any of which may be taken singly or in combination with other remedies. They probably stimulate the appetite more than increase the secretions of the stomach itself. Common table-salt aids in the formation of the acid of the gastric juice and is beneficial in cases in which this acid is deficient in amount. To take the place of the digestive fluids, or to supplement the quantity of them, hydrochloric acid (known also as “muriatic acid” or “spirits of salt”) with pepsin is the most commonly-given medicine. The acid alone is often very helpful. It is to be taken fifteen minutes after each meal, fifteen drops of the diluted acid in half a glass of warm water, drunk slowly. It may be used a long time without any ill effects from the continued use of it. It is best in cases of “nervous dyspepsia,” and when the lining of the stomach is wasted away. In the latter case, pepsin is also necessary. It is used as follows: Mix an ounce of pepsin powder, an ounce of diluted hydrochloric acid and five ounces of the compound tincture of cardamoms; take a teaspoonful in a wineglassful of water a quarter of an hour after each meal. This is enough for forty-eight doses. It is very important to get good pepsin. Much that is sold is useless. The “wine of pepsin” is not nearly so good as the powder or “scale.” Pauceatin and soda, in five-grain tablets, is another good digestive aid. Two or three of the tablets are to be taken fifteen minutes after each meal. When there is excess of acid in the stomach, malt extract is good. Only the light brown preparations of malt are of value.

In chronic dyspepsia, when there is much mucus or slime, one of the most useful things that can be done is to wash out the stomach. This should be done with a stomach-tube, using lukewarm water with 1 per cent (one part in one

hundred of water) of table-salt, or 3 per cent of baking soda. If there is much gas formed in the stomach, use a 3 per cent solution of boric acid to wash out with. Once a day is enough, or every other day for delicate persons. The morning is the best time unless there is stomach distress at night and much flatulency, in which case it is well to wash out the stomach at night, three or four hours after the last meal. The washing is continued each time until the water comes away clear, and some may be left in the stomach. A fair substitute for this lavage (as washing out the stomach is called), is to drink slowly a large tumblerful of warm water with half a teaspoonful of baking soda in it, the last thing at night or on rising in the morning.

The Treatment of Special Conditions.—When the digestion is slow and, in consequence, there is much fermentation (formation of gas) in the stomach, the patient should diet carefully, avoiding particularly tea, pastry and coarse vegetables. For acid dyspepsia, in which there are bitter fluids brought up, use burnt magnesia, five-grain doses, or glycerin in half-teaspoonful doses, or animal charcoal combined with compound cinnamon powder. If there is much pain, twenty-drop doses of chloroform or a teaspoonful of Hoffman's anodyne may be used. If the trouble continues in spite of the treatments adopted, washing out the stomach with the 3 per cent soda solution must be resorted to.

Vomiting sometimes is a troublesome symptom, especially in children. It may be relieved by a drop dose of carbolic acid or creosote, or by a few drops of chloroform in water. When it is a persistent symptom, the stomach must be washed out every day. Bismuth or oxalate of cerium, in five-grain doses, are both very good to stop obstinate vomiting.

Constipation is usually present in indigestion. Occasional small doses ($1/5$ to $1/10$ grain) of calomel, or $1/5$ -grain dose of podophyllin, or the laxative mineral waters, or sulphur, or cascara, may be used over long periods of time with no bad effect due to long use. Cascara should be used only in the form of fluid extract, and it should be made by a thoroughly reliable firm, such as Parke, Davis & Co. Much adulteration of this useful drug is practiced by unscrupulous dealers. It should be taken in doses of twenty drops at first, going to bed, and the dose should be reduced by a drop each night until it is as small as will cause just one free movement of the bowels a day. Another very good and prompt way to move the bowels is to use a glycerin suppository (to be had at the drug store), or to inject a teaspoonful of glycerin into the bowel.

to a mineral spring is excellent. The regulation of the diet and exercise there are of great assistance in educating the dyspeptic how to live. But most people can get well and keep well at home with a little care and self-denial.

The use of good mineral waters is of great benefit in dyspepsia caused by too hearty living—excess in eating or drinking.

GASTRIC ULCER—ULCER OF THE STOMACH.

In this condition ulcers occur in the stomach wall. The causes of the condition are not well understood. It occurs more often in women than in men; usually between twenty and sixty years of age. Impoverished blood has more to do as a cause than any other one thing. Ulcer of the stomach often occurs in women with menstrual disorders, and in dyspeptics; but as these two conditions cause impoverishment of the blood, their relation to the cause of ulcers is probably due to this fact.

The ulcers are like irregular punched-out places in the lining of the stomach, varying in size from a ten-cent piece to a silver dollar. Sometimes they even penetrate through the mucous membrane into the muscular layers, or even perforating the stomach wall. If perforation occurs, the contents of the stomach escape into the abdominal cavity; this causes a peritonitis, which nearly always terminates in death. Sometimes the inflammation, however, walls off the point of the perforation and prevents the peritoneal cavity from becoming infected.

Symptoms.—Vomiting blood, which is usually quite bright and in considerable quantities, is a prominent symptom. There is always pain, which is variable in character, time of occurrence, and duration. It may be a gnawing or burning pain, most marked when the stomach is empty, and relieved by taking food. Sometimes it is very intense, felt not only in the stomach, but also in the back and shoulders. These intense attacks are usually induced by taking food and follow this at an interval varying from ten minutes to two hours. Pressure over the stomach often gives relief from the pain. The patient is generally sensitive to pressure over the stomach, especially at a point an inch or two below the lower end of the breast-bone. These symptoms associated with dyspepsia are clear evidence of ulcer of the stomach.

Treatment.—Absolute rest in bed is essential. The diet is **very** important, and should consist of liquids,—**milk, buttermilk, peptonized gruels and broths.** The stomach may be so sensitive as to require washing out before any nourishment can be retained. Sometimes the stomach will not retain food at all; it is then necessary to keep the patient's strength up by rectal feeding. This part of the bowel can absorb sufficient food to supply the demands of the body for many days. The stomach meanwhile becomes less sensitive.

Medicines have little effect on gastric ulcer; **time and quiet** are the great remedies. The intense pain must be relieved with morphine in quarter-grain doses. The great sensitiveness of the stomach may be temporarily relieved by a powder composed of subnitrate of bismuth, one-half grain; cerium oxalate, one-half grain, and cocaine, one-twelfth grain. This powder may be given before each feeding. In case of bleeding, the patient should be kept as quiet as possible, using morphine; and ice should be applied over the stomach. Three months at least are required for a cure.

CANCER OF THE STOMACH.

Cancer of the Stomach is not a rare disease, occurring between the ages of thirty and eighty,—usually between forty and sixty. The cause is unknown.

Symptoms.—The patient gradually loses flesh, his health fails, dyspeptic symptoms appear, and vomiting occurs. Later the vomited material looks like coffee-grounds (being partially digested blood). The frequency of the vomiting depends on the part of the stomach where the cancer is. Sometimes there is no vomiting, but it is usually a symptom. Pain occurs early in the disease and is an important symptom. It is burning, dragging or gnawing, rarely in paroxysms. It is made worse by food, as a rule. The skin is apt to be tender over the lower seven ribs behind and between the nipple and the navel in front. Nothing will check the progress of the disease. Death usually ends the sufferings within two years. It is often very difficult to distinguish between cancer, ulcer and dyspepsia, and reputed cases of **cure** of cancer of the stomach are really not cases of cancer at all.

Treatment.—One successful case of entire removal of the stomach for cancer has been recorded; but this is very rarely practicable. Operations, however, which relieve the patient at times are justifiable. The medical treatment should be directed to relieving the symptoms. Washing the stomach is often useful for this purpose. When there is no doubt about the presence of cancer, morphine should be used to control the pain. It may be necessary to give it by a hypodermic syringe.

DILATATION OF THE STOMACH.

In Dilatation of the Stomach this organ is stretched so that its capacity is increased much beyond the normal capacity—which is about a quart and a half. It may become so stretched as to have a capacity of one to two or more gallons. The muscle coats lose their power.

Causes.—Anything which obstructs the outlet of the stomach may cause dilatation. Cancer at the outlet (that is, cancer of the pylorus), a healed ulcer, or congestion, may thus obstruct. Overloading and distending the stomach with food and drink temporarily dilate the stomach, and the condition becomes permanent if too often indulged in. In true dilation the food stays too long in the stomach, and it is this prolonged stay of the food and not the increased size of the stomach that is serious.

Symptoms.—Dyspepsia is present in most cases. Belching gas, with a bitter taste, is an unpleasant symptom. Vomiting large quantities of fluid and partially digested food every two or three days is one of the surest symptoms. Constipation, scanty urine, and dryness of the skin usually occur with dilatation of the stomach. In mild forms of dilatation, the gurgling sound from gas in the stomach and the belching of gas and a bitter fluid is called “Water-Brash.”

Treatment.—In mild cases, the treatment is to be directed to curing the dyspepsia. Washing the stomach is very useful. The diet should consist of small quantities of readily-digested meats, gruels, broths and milk; vegetables, fat and sugar should be avoided. Massage of the stomach is helpful.

If improvement is not secured by this treatment, a surgical operation may be required. If it is due to cancer little can be done.

Water-Brash—Pyrosis—is a disorder characterized by copious vomiting of clear fluid, either sourish or tasteless. It is a frequent accompaniment of chronic indigestion, and those who live much on vegetable food are peculiarly liable to it. Before the fluid is brought up there is often pain, more or less severe, at the pit of the stomach. Improved diet, and the treatment of indigestion generally, are the most suitable measures. One of the best remedies for this is the subnitrate of bismuth, of which twelve grains may be taken twice a day, along with five grains of aromatic powder, well mixed in a little milk. A pinch of baking soda in a little water will give prompt relief from the “heartburn” which is often a symptom in this disorder.

GASTRALGIA—PAIN IN THE STOMACH.

There are some nervous conditions which cause pain in the stomach, with various symptoms of dyspepsia, ulcer and cancer. These cases are puzzling and troublesome. A careful study of the case by a thoroughly-trained doctor is necessary to determine just which condition is present. The general treatment for nervousness is necessary.

Nausea—or inclination to vomit, is known to all. Although the feeling of nausea itself is referred to the **stomach**, and may be due to causes connected with that organ simply, it also very frequently originates in disorder in **other and distant parts of the body**, a fact which often makes it a valuable symptom. Causes which act directly upon the **brain** are among the most frequent, and there is every reason to be believed that the sensation from which the term is probably derived—sea-sickness—is primarily excited in the brain itself. As all know, a blow on the head occasions nausea and vomiting; severe injuries in other parts of the body, such as a dislocation, also occasion sickness by acting indirectly upon the stomach; the nausea of **pregnancy** is another example of this sympathetic nausea. Disgusting **odors** are instances of the same thing. The action of drugs of an **emetic** character is due to their influence on the nervous system, for they act equally well whether injected in solution into the veins, or if swallowed. Lastly, the presence of **indigestible food**, or of **bile**, etc., in the stomach itself, will also cause nausea; it may also be produced by simple over-distention by gas or fluid. The instances given of sympathetic nausea show it to be a valuable guiding symptom in the investigation of disease. Incipient or advanced affection of the brain, gall-stones, stone in the kidney, disease of the womb, pregnancy, and many other conditions of various organs, give rise to the sensation of nausea, or to actual vomiting.

The means of relief in nausea, and its very frequent accompaniment, vomiting, must, of course, depend upon the cause. When dependent upon brain affection, remedial measures are of but little service, but may be resorted to. Effervescing draughts, with lemon juice, or simply aerated water, will often be extremely useful. Spirit of chloroform, in doses of twenty minims, is generally effectual, and is now much used in sea-sickness. A teaspoonful of magnesia in a glass of sherry has been found a good remedy, but one which is inadmissible in head affections; a mustard plaster to the pit of the stomach is good. When the nausea is dependent upon the presence of bile or other matters in the stomach, it is soonest relieved by exciting vomiting, which is easily effected, either by means of lukewarm water alone (and putting the finger or a feather in the throat), infusion of chamomile, or at all events by a small dose of ipecacuanha. Quiet and rest and no food are also helpful. After the stomach has been cleared, effervescing draughts will be at once grateful and beneficial.

Vomiting is the action of discharging the contents of the stomach through the gullet and mouth by muscular effort, or rather by a combination of muscular efforts. Everyone is conscious, that previous to the act of vomiting, a deep inspiration is taken; by this the diaphragm is forced downward towards the cavity of the abdomen, and being there fixed, or rendered tense, by the contraction of its own fibers, it offers a fixed point of resistance, against which the stomach can be pressed by the contraction of the muscles in the forepart of the abdomen. At the moment that this almost convulsive pressure is exerted on the stomach, and by the stomach on its contents, the muscular fibers at the “cardiac” junction of the stomach with the gullet are relaxed, so as to permit of the passage upwards of the matters contained in its cavity, while, at the same time, the glottis is closed, so as to protect the larynx and air passages, as in swallowing.

Vomiting is frequently preceded by nausea, but not always; probably it is not so in the vomiting of infants, which overfill their stomachs, for nausea is a sensation which causes uneasiness and distress, and yet the little creatures gen-

erally look remarkably happy while they relieve their stomachs of the overload. Again, some persons, especially dyspeptics, possess the power of vomiting at will, and can, without any feeling of nausea, discharge the contents of the stomach; neither is there much, if any, feeling of nausea connected with the vomiting which sometimes follows coughing, sobbing and over-eating.

The causes of vomiting are very numerous. It may depend on local irritation of the stomach by bile, mucus, etc., or by indigestible food, by medicine, or by poison; it may be excited by the mechanical efforts, and probably through the intimate nervous communications in cough, hiccough, sobbing, laughing, etc.; it is often sympathetic with and symptomatic of disease or accident in distant parts, or of excited action in distant organs, as in the case of the womb in pregnancy, or in sea-sickness. Irritating or tickling the throat likewise causes vomiting. In some persons, disagreeable or peculiar tastes, smells, and even sights and sounds, will give rise to vomiting; mental emotion will produce it, and certain drugs, such as tartar emetic, give rise to it if injected into the blood. At the onset of acute disease, vomiting is a common symptom. When a person becomes affected with vomiting, it is of course well to keep these various causes in mind; for though, in the majority of instances, perhaps, vomiting depends upon disorder in the stomach itself, it must evidently be of much consequence to recognize it as symptomatic of disease, which is often of a serious character.

When vomiting has been preceded by symptoms of indigestion, or when it is of a bilious character, accompanied with furred tongue, etc., the probability is that it depends upon the presence of bile or other matters. In such cases, if the natural process of relief appears inclined to be sufficiently energetic, it will be enough to assist by drinks of tepid water or gruel, or of chamomile tea; if the action is not sufficient, an emetic (see Emetics) may be given to fulfill the natural indications. These attacks of spontaneous vomiting from disorder of the digestive organs are frequently accompanied with diarrhea; but when this does not occur, it is generally advisable to give aperient medicine in some form, and as the stomach often remains unsettled, nothing seems sooner to restore it than a few effervescent draughts, either simple, or containing a tonic bitter.

Vomiting, however, may continue from simple irritability of system or stomach, after the irritation in the latter organ has been removed; when it does, means for allaying that irritability must be resorted to, similar to those employed when the vomiting is the result of sympathy, as it is in pregnancy, etc. In any case, obstinate vomiting is so distressing a symptom, and one so injurious to some patients, that it is desirable at all times to put a stop to it.

If there is offending matter in the stomach, which is the cause of the vomiting, it is, of course, useless to attempt to stop the latter till the former has been removed, as adverted to above.

Small fragments of ice allowed to melt gradually in the mouth will frequently allay the irritation of the stomach. Opium, chiefly in the form of hydrochlorate of morphia solution, may be given in doses of from ten to twenty minims, or may be combined in less proportion with from ten to twenty grains of subnitrate of bismuth. The fermented preparation of milk called Kouniss will often remain on the stomach while other foods, including fresh milk, are rejected. The obstinate vomiting of pregnancy may be stopped by one-drop doses of ipecacuanha wine, given every hour in a teaspoonful of water. In other cases, two-drop doses of tincture of nux vomica in a drachm of water may succeed.

Subject Reference

See *Inflammation*, pages 2, 15, 164, 335, 372, 374, 390, 409.

For *Inflammation of the Lungs*, see also *Pneumonia*, page 336, *Prescription*, 614.

Inflammation in General

Character and Progress.

REDNESS—SWELLING—TEMPERATURE AND PAIN.

Inflammation is characterized by redness and swelling of the portion affected, and also by an increase of temperature and pain. When these phenomena occur on a visible part, they are recognizable by all, but when they occur internally, their presence must be judged of by other symptoms. When inflammation of a part occurs, the chief effect is increase of blood to it, the stream being quickened in some parts, and in others impeded, whence arise the characteristic redness and swelling, heat and pain, the latter, especially, being the result of pressure on the nerves by the distended tissues. After the process has continued for some time, it may subside, the parts resuming the same appearance and action which they had before. This termination of inflammation is named “resolution.” In the event of inflammation not terminating by “resolution,” it may give rise to effusion of serum, that is, of the watery portion of the blood; this effect is familiar in the case of scald or blister; internally, it happens in pleurisy, in inflamed joints, etc.

A third most important termination of inflammation is the effusion of what is called “lymph,” that is, of an adhesive—at first liquid, afterwards solid—matter, which becomes a permanent connection between two parts; thus, in inflammation within the abdomen, it may glue the bowels together; in the chest, it may fix the lungs to the side, or the heart to its containing bag. Nevertheless, even internally, it is often beneficial; it may seal parts together in such a way as to prevent the escape of matters, as, for instance, from the bowels into the abdomen, which must otherwise have proved fatal.

But inflammation may go on to the formation of pus or matter, as in the case of abscess (see Abscess). Or ulceration may take place (see Ulcer), or, lastly, the vitality of the inflamed part being completely destroyed, **mortification** occurs, and the tissues slough or break down into one putrefying mass. These various effects of inflammation are, in some degree, dependent upon the violence of the action in the first instance, but they are modified by the nature of the affected tissue. What has now been said, however, will demonstrate how closely this important process is connected with the whole science and practice of medicine, and how greatly all treatment must have reference to it, and, especially, to induce its termination in “resolution,” which leaves the affected part uninjured in structure and function.

The means to procure resolution of inflammation are **bleeding**, **cupping** and **counter-irritation**, which relieve the overloaded and obstructed vessels; further, **fomentations** and **poultices**, that is, heat and moisture, which relax; also medicines, such as diuretics, diaphoretics, purgatives, etc. In some cases, when inflammation is near the surface, it is treated successfully by the direct application of as-

tringents to the parts. Thus, inflammation of the covering membrane of the eye is cured by an stringent wash, along with the more directly medical treatment; the diet in most cases of active inflammation requires great reduction. In addition to the local symptoms of inflammation, there is fever.

Of the abdomen, the most important inflammatory diseases are those of the stomach and bowels generally, and of the liver and kidneys, and the womb. In addition to the above, there are inflammations of the blood-vessels, especially of the veins, inflammation affecting the bones, joints, etc.

INSTRUCTION FORTY-SIX—*Intestinal*

Diseases of the Intestines

THE BOWELS:

Health and Activity of Mind and Body
Depends Largely on Knowledge and Attention to the
Conditions of the Bowels and Diseases
of the Intestines.

NOTE:—Physicians Agree that a Large Percentage of Ordinary Illness, Serious or Otherwise, is Caused Directly by Accumulated Waste in the Colon.

Subject Reference.

See Vol. 1 for Description and Function, pages 7, 48, 51; Process of Digestion, 107 to 147.

See Vol. 2 for Surgical Diseases and Injuries of Intestines, pages 195-200; also pages 208-218.

Inflammation of the Bowels, Peritonitis, Stools, Color and Nature of the Evacuation, Straining, Diarrhea, Constipation, Flatulence, Colic.

INFLAMMATION OF THE BOWELS.

Inflammation of the Bowels causes acute pains in the abdomen, costiveness, more or less fever, and sometimes vomiting.

Causes.—It may be caused by obstinate and long-continued costiveness, by wounds and injuries to the intestines, by infection with certain germs, by severe colic, by indigestible food, by eating unripe fruit, and by exposure of the lower extremities and abdomen to cold.

Symptoms.—Burning and acute pain in the bowels, which usually darts round the navel; usually diarrhea; vomiting of bilious or dark-colored matter may occur; urine high-colored; pulse quick, hard and contracted; some fever, thirst and great loss of strength and of flesh. The patient may belch up gas.

Treatment.—Soak the feet in warm lye-water. Apply hot cloths over the abdomen (flannel cloths dipped in hot lye-water). If there has been constipation give a large tablespoonful of castor oil, with half as much olive oil, and half a teaspoonful of spirits of turpentine; repeat this dose every two hours till an

operation on the bowels is obtained. After the second or third dose is taken, an injection of the same may be given with a little warm milk added, and a teaspoonful of salt dissolved in it. If these means do not succeed in opening the bowels, give more powerful injections, such as an ounce of Epsom salts, an ounce of glycerine and a pint of hot water; give this warm. The patient should lie on his back, with his hips raised on a pillow, to take the injection. It should be retained some time.

In severe cases apply to the abdomen hot fomentations, a hot-water bottle, or hot fomentations with a teaspoonful of turpentine in the water out of which the cloths are wrung, to be changed often.

If the costiveness continues, put the patient in a warm bath for half an hour.

The diarrhea when present should not be suddenly checked. Aromatic chalk mixture or bismuth subnitrate, or small repeated doses of calomel, are all good. Morphine may be necessary for the pain. The diet is of great importance; it should be liquid—broths, milk, thin gruels, etc.

“Inflammation of the Bowels,” Peritonitis.—Inflammation may affect any portion of the alimentary canal—the stomach, the large and small bowels, or it may attack its covering membrane, the “peritoneum,” or its lining mucous membrane. Inflammation of the peritoneal covering of the bowels is one of the most formidable and often one of the most painful of the acute diseases; it may be confined to a small portion of the abdomen, or be spread over the whole peritoneum, or be limited to part of it, hence medical men distinguish general and local peritonitis.

The onset of peritonitis, or inflammation of the covering membrane of the bowels, like that of other inflammatory diseases, is attended with fever, languor, depression, shivering, vomiting or nausea, and is followed by heat, thirst, and quick pulse. There is usually constipation, and the tenderness which is present and which prevents one from pressing on the painful part with the hand, is a very strong indication of peritonitis or of inflammation in some part of the bowel. Either simultaneous with these symptoms, or shortly after, there is usually intense cutting or burning pain in the abdomen, general or confined to one spot, according to circumstances. **This pain is much increased by pressure.** so much so, indeed, that even the weight of the bed-clothes cannot be borne, and the patient lies on the back with the knees drawn up—an attitude very characteristic of this disease—in order to keep off the weight of the clothes. At this time, the pulse, which is very quick, is usually of a peculiarly hard and wiry character. The symptoms of peritoneal inflammation of the bowels are usually so well marked as to be distinguishable even by an unprofessional person; when they do occur, especially under circumstances to be hereafter pointed out, as likely to occasion them, it need scarcely be said here, that a medical man should be called with the shortest possible delay. The disease is most serious and dangerous, often very rapid in its course, and cannot too soon be submitted to the active treatment which skill and experience alone can venture upon. In the meanwhile, the provisional remedies to be adopted must be, in some degree, regulated by circumstances. If many hours must elapse before medical assistance can be obtained, a warm bath for half an hour will be useful, and hot fomentations assiduously used for a long time will give much relief, being preferable to the hot poultice, the weight of which, probably, could not be borne, unless made very light. The bowels should be prevented from acting for some days, and then gently relaxed by means of castor oil. The best medicine is opium, to relieve pain and subdue inflammation. It

should be given in doses of 1 grain every 3 or 4 hours until the doctor arrives. The diet must of course be reduced and nothing but diluents, such as thin gruel, barley and toast water, allowed. In following out the above directions, an unprofessional person, at a distance from medical aid, would be doing the utmost possible to keep the disease in check; the means may, of course, require varying in some degree, but in this, as, indeed, in all such matters, something must be left to the judgment of an intelligent person.

A doctor should be called at once. The patient must be **kept in bed, quiet**, on a light diet (or no food at all for 12 to 24 hours). Treat the vomiting. Apply **hot** cloths over the pain and keep them hot by changes. The causes of inflammation of the bowels are chiefly cold, the abuse of stimuli, or of strong purgative medicines, mechanical violence, constipation, appendicitis, a loaded state of the bowel, and child-birth. A most severe and rapidly fatal case of inflammation of the peritoneal covering of the bowels was traceable solely to the individual rising from a warm bed and standing for some time on a stone floor barefoot. Inflammation of the lining of mucous membrane of the bowels, is generally associated with diarrhea or dysenteric affection, and to these articles the reader is referred.

Stools.—The evacuations from the bowels always afford important indications of the state of the health; they are, therefore, generally watched by medical men in cases of illness, and as a general rule should be saved for their inspection.

In infancy, the discharges from the bowels are generally lighter-colored than they are as life advances; this, perhaps, being partly, but not altogether, due to the usual milk nourishment, which, even in adults, if taken largely, tends to give a lighter color to the stools. In infancy, moreover, the appearance of the natural evacuations is liable to vary greatly in color, and, especially when there is disorder, acidity, etc., to assume a green tinge, either as directly passed from the bowels, or soon after exposure to the air, even if the motion has, in the first instance, been of a yellow or orange hue. These green evacuations generally follow attacks of pain, with too abundant acid. As children get beyond infant life, the stools, particularly in those with light hair and complexion, are apt to become either entirely or partially of a clay color, evidently from deficiency of bile. In such cases, it is not uncommon for gray powder or calomel to be given, with a view of increasing the flow of bile, which these medicines certainly do, and for a few days the motions are improved in appearance, but only for a few days; they soon become as unhealthy looking as ever, the benefit derived from the mercurials being only fallacious, or worse—causing injury rather than benefit. The true cause of these clay-colored stools, in most instances, is the inability of the blood to furnish an adequate supply of the healthy bile; consequently, to stimulate the liver to secrete an increased quantity under these circumstances, is to impoverish the blood. A course of iron tonics, with a good supply of animal food, and, if need be, a little wine or malt liquor, is much more likely to bring the motions to the color of health, permanently and beneficially. Not that an occasional dose of gray powder may not be useful, but it is not the remedy. In adult life, the stools become clay-colored, or chalky, from a different cause or causes, the most usual being obstruction to the flow of bile—(see Jaundice), but also from deficient secretion consequent upon disease of the liver, such as occurs in drunkards. The stools may vary in consistence, being either too hard or too liquid; the former is the case in persons of costive habit, in whom the fecal con-

tents pass so slowly through the bowels that their liquid components are too much absorbed. In the latter case, the too liquid condition of the motions is associated, generally, with tendency to diarrhea. The form of the motions may, by its peculiarity, convey important information; thus, in an enlarged state of the "prostate" gland at the neck of the male bladder, or in cases of permanent piles, they assume a flattened form; or they may be diminished in size by narrowing of the gut. The general bulk of the stools must, of course, depend much upon the amount and quality of the food; inattention to this fact sometimes misleads. It is not uncommon for persons to imagine that, so that the bowels are regularly moved once a day, they must be in a perfectly free state, forgetting that, though they may discharge a portion of their contents, they do not necessarily discharge all; and such is really the case. In old people especially, enormous accumulations of fecal matter are apt to take place, while the person is under the impression that, because there is a daily stool, the bowels are periodically fully relieved. On the other hand, again, the popular impression seems to be that the bowels fulfill no other office than that of a passage for the food refuse.

Various articles of food, such as the seeds and skins of fruits, will, as mentioned above, affect the appearance of the stools, and medicines do so more especially; iron, in particular, forms an inky black with the coloring matter of the bile, and as persons are often unnecessarily alarmed at the appearance, when iron is prescribed, the circumstance should be known. Rhubarb, senna, etc., in some degree impart their color to the stools. Mercurials modify them, causing an olive or deep-green appearance, which may be kept up for a length of time, if mercurials are too continuously given. Persons are thus deceived at times, and under the idea that the motions do not become healthy, go on purging with the mercurials, which are themselves the cause of the unhealthy appearance. Other purgatives may have the same effect in a lesser degree. In unhealthy states of the system, and especially in some febrile affections, the stools become much more offensive than in health. When such is the case, the bowels generally require purging.

The stools may contain blood. If this comes from the stomach, or high up in the intestinal canal, it is usually black and pitchy in appearance, and often highly offensive; stools of this kind often occur after severe bleeding at the nose when the blood has been swallowed. The blood may be fresh and clotted, and either dark or florid (see Piles). In some cases the stools contain large quantities of mucus, simple or gelatinous-looking, or they contain matter. In all such cases the motions should be kept for inspection, and a medical man sent for as soon as possible.

Straining at stool may arise simply from costiveness, and therefore is probably habitual; it is, moreover, one of the chief evils of costiveness, for not only is it apt to induce rupture in the predisposed, but, in the aged, it may bring on head attacks. Straining, or, as it is called medically, "tenesmus," occurs as a consequence of an inflamed and swollen condition of the lining membrane of the rectum, such as occurs in diarrhea, etc.; there is the sensation as if the bowel was still unrelieved, and constant instinctive efforts are made to free it; they only increase the evil, and should, by an effort of the will, be desisted from, if possible. In children, straining and sitting too long when the bowels are evacuated may cause falling down of the bowel. The custom should be corrected.

Diarrhea consists in frequent and urgent calls to relieve the bowels, the evacuations being more liquid than usual. The causes of diarrhea are very numerous, but may be classed under three heads, **nervous** causes, causes which act upon the **surface of the body**, and **irritating** causes, which act directly upon the bowels themselves. Perhaps the simplest form of diarrhea is that arising from nervous causes, such as some experience on the approach of a thunder storm, or such as arises from emotions, as, for example, fear. In these cases the bowels would appear to be simply "relaxed," the evacuations being healthy with the exception of being thinner, from the greater amount of fluid which is secreted by the lining of the bowel, owing to the nervous disturbance. The simple salutary diarrhea, in teething children, is an example of the same kind.

Influences affecting the body, particularly cold, and especially cold feet, often produce diarrhea; cold nights succeeding hot days often occasion the disease, but it is also remarkable that diarrhea is apt to occur at the breaking up of a long frost, indeed, it may then be epidemic, that is, of general prevalence.

By far the most frequent cause of diarrhea, however, is irritation in the bowels themselves, caused either by undigested or indigestible food, or by biliary and gastro-intestinal derangement; it may also be caused by an accumulation of hardened feculent masses, or by the lodgment of such matters as the skins of old peas or beans or of raisins, in the folds of the large bowel; the above are frequent causes of teasing diarrhea in children. Lastly, diarrhea may be dependent upon disease of the bowels themselves, such as inflammation of the mucous membrane of the intestines, ulceration or disease of the minute glands, when it constitutes dysentery, or ulceration of the glands and of the lining membrane, such as occurs in typhoid fever and consumption.

It must be remembered, however, that to some persons a habitually relaxed condition of the bowels is natural, and at the same time essential for health, and that to check it is dangerous. It must not, either, be lost sight of that diarrhea is in many cases salutary, an effort of nature to free the constitution from some morbid matter which, if retained, would produce disorder or disease. On this account, the simple forms of diarrhea are better left to right themselves so long as they keep within moderate bounds; this caution is particularly to be observed with regard to that which occurs in the teething of children, which, when moderate, is a safeguard; and also in Bright's disease of the kidneys. But when the diarrhea becomes so frequent that the child is evidently weakened by it, and especially if the evacuations appear to be losing their feculent character and become like shreds of skin, or streaked with blood, then a warm bath for six or eight minutes, temperature 92°, should be used for two or three evenings in succession; isinglass or gelatine given in the milk food, and the castor oil emulsion with yolk of egg given three or four times a day, each dose containing from a quarter to half a drop of laudanum. Of course, medical assistance should be procured if the complaint is not quickly moderated, for checked entirely it should not be.

In diarrhea resulting from exposure to cold, the treatment is to moderately re-excite the skin, and also, if requisite, to administer the remedies for continued diarrhea.

When diarrhea is caused by irritating matters in the bowels, one thing is evident—it cannot be properly relieved unless the bowels are freed from the irritant matters; it may, it is true, be stopped under these circumstances, but it

will recur unless the irritating substance has been removed by the diarrhea previous to the use of the astringent medicine, and the continuance of the diarrhea is merely the consequence of the previous irritation. In many cases in which the diarrhea is due to irritant matters in the bowels, all that is requisite is to relieve the bowels by a dose of castor oil or by some saline aperient followed up by demulcent drinks, to which, if there is acid in the stomach, a little carbonate of soda is to be added. In other cases, when the action of the bowels is constant, painful and exhausting, it is absolutely necessary to check these symptoms in the first place, and to soothe the bowels, before means are resorted to for freeing them from the irritant causes. For the former purpose, the common chalk mixture in three tablespoonful doses, with the addition of five drops of laudanum to each, may be given at short intervals till the disease is checked; or the compound chalk powder—dose thirty to sixty grains (or the same powder, with opium, dose, five to twenty grains), is useful. Or **aromatic confection** may be given in half drachm doses in water, with or without laudanum. If the active diarrhea does not, from its comparative mildness, require these remedies at first, or when it is sufficiently moderated, the bowels should be thoroughly cleared out with a tablespoonful dose of castor oil, to which ten drops of laudanum have been added; this will clear away the irritating matters, if they consist of indigestible substances, hard feculent matter, or the like. When castor oil cannot be, or is not taken, the best substitute is ten grains of rhubarb and six of calcined magnesia, with some aromatic, such as half a teaspoonful of tincture of rhubarb, and if there is much pain, five to ten drops of laudanum, the dose being repeated, if requisite. After the action of the opening medicine one or two doses of astringent may again be required, as the bowels are apt to keep up acting, simply from irritability.

When diarrhea has been permitted to pass into the stage of irritation, when there is tendency to fever, the belly tender, the tongue red, and the motions resemble shreds of skin, or pieces of jelly, and are mixed with blood, the case is of that serious nature that medical assistance should at once be obtained, if it has not been so before. In the meantime, the emulsion of castor oil with yolk of egg will be found the safest and most effectual medicine; two tablespoonfuls, with five drops of laudanum, being given every four hours, and starch and laudanum injections; the diet being as bland as possible, and containing abundance of gelatine. A most excellent drink in these cases is rice water, in each pint of which from a quarter to a whole ounce of gelatine or isinglass is dissolved, with a piece of toasted bread to flavor it, or a little cinnamon.

In the more severe forms of diarrhea, such as that connected with consumption or fever, or when fever is present, medical attendance should be called, but when none can be had the disorder must be treated according to such of the methods above detailed as may appear most suitable. In all probability the soothing and astringent plan, such as chalk with opium, will answer best. Bismuth is of much service in some of these cases. Pain generally should be treated with warm fomentations, or the hot bran poultice. The use of diluted sulphuric acid in frequently repeated doses of ten to twenty drops, of the diluted nitromuriatic acid, in similar doses, in pure water, or combined with a teaspoonful of the compound tincture of gentian, are remedies which have been found serviceable in obstinate diarrhea.

During the late summer or early autumn persons are liable to suffer from a

form of aggravated diarrhea occurring epidemically, often attended with nausea and vomiting, and always with profuse watery evacuations. There is great thirst, accompanied with pains in the stomach and bowels, often amounting to cramp, the pulse is rapid and feeble, the voice becomes weak, and the countenance sunken and anxious. The skin at the same time is cold and damp, and the urine scanty and suppressed. The first thing to be kept in mind is, that the manifestations are not the disease; that the actual outbreak is only an effort of nature to free the system of morbid matter; that we may guide, control and stop, if matters go too fast, but must not thwart. In a severer attack, when pain, purging and other symptoms become urgent, it is time to interfere. The patient, if not in bed—which, however, frequently happens, from the attacks coming on in the night—should go there at once, and hot applications, and such like, used to the bowels to relieve the pain; or more extensively to the limbs, back, etc.; if there is much coldness or cramp. Twenty to five-and-twenty drops of laudanum should be given to allay pain and moderate purging, and repeated if necessary. If the stomach will not retain liquid of any kind, chloric ether in the dose of fifteen or twenty drops should be given, either in combination with laudanum, or in the form of chlorodyne. Sometimes the vomiting is so obstinate that no ordinary means will stop it. Dilute hydrocyanic acid in the dose of five drops at a time may be employed; or four to eight drops of chloroform in a little sugar and water, or brandy and water, might have the desired effect. Two tablespoonful doses of the ordinary chalk mixture, either with or without the laudanum, or half-drachm doses of aromatic confection, will be useful when purging continues. In addition to these means, ice, cold water, diluent demulcent, barley and rice water, with isinglass or gelatine dissolved in them, are to be taken. In case of extreme depression, stimulants, hot brandy and water, etc., are to be administered.

Diarrhea may occur as a chronic, or long-continued affection, lasting months or years; but these cases depend on such a variety of causes and influences, and require so much care in treatment, that they can only be advantageously managed by a medical adviser, and ought as soon as possible to be put under the care of one. In these and in all cases of bowel complaint, diet exerts great influence. (See article on Diet in Diarrhea.)

Constipation, or Costiveness, is a sluggish or torpid action of the bowels, and consists in the retention of the fecal contents, and their evacuation in a harder and drier condition than natural. The state is one, in great degree, dependent upon habit and constitution, for that which would be considered constipation in one person, would not be so in another. As a general rule, however, the bowels ought to relieve themselves, **thoroughly**, once in the twenty-four hours; when such is not the case, the condition may be said to be one of constipation.

With some individuals, a single evacuation of the bowels, once every three or four days, seems to be sufficient, and perfectly compatible with their enjoyment of perfect health; and, when such is the case, it is of course superfluous to endeavor to correct it, and it is better to let well alone. If, however, in conjunction with this condition of the bowels, the persons suffer from headache, from languor, from distention of the abdomen, if the breath is disagreeable, and the tongue furred, the state is **not** compatible with health, and should be corrected.

The causes of costiveness are very numerous, the nature of the food, as might

be expected, exerts considerable influence; bread badly made, and especially if alum be mixed with it, cheese, milk with some persons, farinaceous articles, such as arrow-root or ground rice, and food of too concentrated a character, all tend to constipate. Deficient exercise, particularly if combined with much exertion of mind; any drain upon the system, as in suckling, abundant perspirations, loss of nervous power, and old age, have the same effects. Pregnancy, and tumors in the abdomen, constipate by mechanical obstruction, and, in the same way, contraction of any portion of the alimentary canal. The colon or large bowel is very frequently the seat of the constipation, it loses tone, allows itself to be distended, sometimes to an enormous extent, or contracts to a very narrow calibre in some portion of its course. Lastly, a very common inducing cause of costiveness, particularly in females, is inattention to the intimation of nature to relieve the bowels.

As, except in the case of a few persons of constitutional peculiarity, confined bowels cannot be compatible with health, comfort or activity of either mind or body, the state must be rectified, and that in a proper manner, not as it is usually attempted. Perhaps there is no ailment to which the human body is subject which is more frequently mismanaged than constipation. Every effort should be made to correct the disorder without the aid of medicine. In the food, all those articles which have been enumerated, or which are known to constipate, must be avoided; the bread used should be made of coarse flour or whole meal; if vegetables and fruits agree in other respects, they may be freely consumed, and cocoa substituted for tea or coffee; food is not to be taken in a state of too great concentration, but so that, by the bulk of its refuse, it may afford substance to stimulate the action of the bowels. In addition, there are various articles of diet which exert an aperient effect, and which may be used or not according to the taste of the person: such as oatmeal in the form of porridge, honey, prunes, etc. Exercise, whether on foot or horseback, is another valuable aid in the removal of the costive state; it not only quickens all the functions, but it assists by the mechanical motion it communicates to the muscles of the abdomen; a similar effect may be produced by frequent flexion of the thighs, calling into play the same muscles, as in the action of moving up and down stairs. Prisoners who have a certain amount of work to do daily on the tread-mill rarely suffer from constipation. Another very important point is regularity in the time of evacuating the bowels; not waiting for the urgent sensation, but retiring for the purpose at one set period of the day, when time can be given. The bowels are greatly influenced by habit, and they can be trained to act periodically by persisting to make them act at a stated time each day. Persons who are liable to costiveness should give themselves at least a quarter of an hour, or even longer, for the daily evacuation of the bowels. Lastly, as constipation is so frequent an attendant upon the sedentary life of the student, and upon the anxious-minded man of business, a holiday both from books or desk, and change of air and scene, is both a good and pleasant remedy.

In children, who occasionally suffer from constipation, a little fluid magnesia mixed with their milk, or a teaspoonful or two of confection of senna, or the same amount of castor oil will usually meet the requirements. Further, a very good remedy, which often supersedes the use of medicine, is friction of the back and limbs—the spine being rubbed gently, from the nape of the neck downwards, with a little olive oil daily for ten minutes.

When neither diet nor regimen will effect the cure, other means must be had recourse to. If there is simple costiveness, without disorder of the digestive functions, the best remedy will be the regular use of some harmless aperient, as castor oil, the colocynth and hyoseyamus pill, or saline mineral water, such as Hunyadi or Friedrichshall; if, on the other hand, furred tongue, with acidity of stomach, flatulence, pain between the shoulders, headache, etc., betokens deranged digestion, special medicine to meet the case will be required, at all events in the first instance; the liver is probably at fault, and five or six grains of blue pill, or of compound colocynth and calomel pill, followed in the morning by the black draught, or by castor oil, will be requisite.

When the bowels have been well cleared by the above medicines, it is requisite to **keep** them open, otherwise a few days will see all the symptoms return, and, in fact, such is too often the case; persons are content with taking a dose of strong opening medicine every few days, or once a week, as the case may be, and rest content with this, as it is called, having a good clearing-out—albeit they are under the necessity of increasing the strength of the doses. The practice is one incompatible with sound health, and is most injurious to the stomach and bowels themselves; many cases of obstruction, and even inflammation of the bowels, are produced by it. The principle to be proceeded upon in the treatment of costiveness is, that it is more easy to keep the bowels in action than to excite them to it when they have become thoroughly torpid, and therefore the individual should not rest content without the daily evacuation. If simple constipation, depending upon inaction of the lower bowel, exists, the use of a salt water enema will in all probability be sufficient; but medicine may be required, perhaps daily, for some time, or it may be used alternately with the enema. Some medicines are more than others adapted to the treatment of habitual costiveness, and of these castor oil, aloes (alone, or in its combinations), senna and Epsom salts are the principal; their great advantage is—not losing their effect by continued use. When castor oil can be taken regularly, in most cases it answers extremely well, and if taken regularly, the dose requires rather diminution than increase; it is a medicine, moreover, which never seems to injure the tone or the mucous coat of the bowels. In the constipation of pregnancy, castor oil is so well known as the best and safest aperient, that it scarcely requires mention. Aloes is peculiarly well adapted to relieve certain forms of costiveness, particularly that of the sedentary, and may be taken in the form of pill, in combination with soap, in the compound rhubarb pill or compound colocynth pill; any of these are most excellent combinations. If there is debility of stomach, the addition of a quarter or half a grain of quinine to each pill increases the efficiency of the medicine and gives tone to the stomach. The quinine must not be continued for more than a fortnight at a time. The dose of aloes when regularly taken does not require to be augmented. When quicker action is required, the compound decoction of aloes may be taken with advantage instead of pills, or a pill containing one-sixth of a grain of the extract of *nuxvomica* and five grains of the compound colocynth pill. The principal contra-indication to the use of aloes is the occurrence of piles, which, if inflamed, or if the dose be too strong, are apt to be aggravated by the medicine; in this case, castor oil, or infusion of senna, or the enema, should be substituted, for a time at least. In some cases, on the other hand, when the piles are not inflamed, aloes taken regularly in small doses, seem to exert a beneficial and curative action

upon them; probably in consequence of keeping the intestinal veins from becoming overloaded with blood. Senna is a medicine well adapted for the relief of costiveness; it is perfectly safe, and does not seem soon to lose its effect. Ipecacuanha, not alone, but in quarter or half-grain doses, added to the aloetic pills, exerts a most beneficial effect in cases of habitually confined bowels. A weak solution of Epsom salts, a drachm to the half-pint of water, with or without the addition of five or ten drops of dilute sulphuric acid, when taken on first rising in the morning, will prove effectual with some, and forms a change from the use of the other aperients. As age advances, the bowels become more sluggish, and require to be assisted in their action by aperients. When the ordinary remedies mentioned above fail, it is necessary to employ drastic purges, such as we have in croton oil, gamboge and elaterium. Again, it is repeated, keep the bowels free, by food, by exercise, by habit, if possible; by injection or medicines, if necessary; but **do not let them become costive.**

A most excellent remedy is fluid extract of cascara sagrada (the bitter, not the aromatic). Use a medicine dropper and measure the dose exactly. Begin with thirty drops as the dose, taken in water when going to bed. Reduce the dose each night (or more quickly if it acts too vigorously) until the lowest efficient dose is reached. Take this medicine every night. It is a mistake to take it just occasionally.

In some individuals, in whom the walls of the abdomen are very flaccid, and do not afford sufficient tonic support to the contained bowels, costiveness frequently exists, and is much remedied by the use of an elastic or other belt, worn to support the entire abdomen.

In the treatment of constipation, one must be sure that it is a true case of habitual constipation; and this is not always an easy matter. Hemorrhoids, fissures of the anus, hypertrophy of the prostate, tumors of the uterus or ovaries, retroflexion or antelexion of the uterus may all give rise to constipation. Diseases of the intestines themselves, such as stenosis, and diseases of the stomach, such as excess or lack of acid, may produce similar conditions.

When the constipation is due to a faulty condition of the bowels, either hygienic or dietetic errors are generally the cause. One of the greatest abuses in correcting the constipation is the use of drugs which will destroy, after a while, the function of the bowel. Another frequent cause is the neglect of attending the calls of nature.

To sum up the treatment of constipation, one must secure: 1. **Correction of bad habits.** 2. **Regulation of the diet.** This may be done by avoiding concentrated foods and by partaking of vegetables rich enough in coarse fibers to make sufficient bulk to furnish mechanical stimulation to the bowel. Food should be selected which is rich in elements for the formation of organic acids, and for the liberation of gas, thus producing chemical stimulation of the intestines. 3. **The liberal use of water, at least six to eight glasses in the twenty-four hours.**

Flatulence, or the collection of gas in the stomach and bowels, is very commonly the result of indigestion; but it is often also due to nervous disorder. In the former case, it is probably chiefly due to the evolution of gas from the badly-digested food mass in a state of partial fermentation; in the latter, it is only possible to account for the enormous amount of flatus or wind by its formation (secretion) in the bowels. A certain amount of gas in the bowels is natural in health. In the course of typhoid fever and in many acute diseases of the in-

testinal tract, flatulent distention of the bowels, or "tympanitis," as it is called, is always an unfavorable symptom.

Persons who suffer from flatulence should avoid most kinds of vegetables and fruits; individual experience, however, is the best guide in this. When a severe attack of flatulence comes on, carminatives (such as camphor, asafetida, valerian, aromatic substances) and stimulating remedies are generally resorted to, and often prove useful; but in many cases, particularly in a nervous individual, with pale tongue, the mineral acids will be of more service—either twenty to thirty drops of dilute nitric acid in a wineglassful of infusion of orange peel, or some other warm bitter, or, better still, aromatic sulphuric acid in ten-drop doses in a wineglassful of water. A favorite remedy is the nitro-hydrochloric acid given in doses of ten or fifteen drops in water three times a day. Carbolie acid in one-drop doses, twice or even thrice a day is a very good remedy. It is easily taken in a little peppermint water with glycerine, one ounce of the one to half a drachm of the other. In general flatulence of the bowels, with difficulty of expulsion, enemata of asafetida or turpentine are most useful.

Colic is the painful spasmodic contraction of the muscular fibers of the bowels, particularly of the colon, occasioned by the presence of an undue amount of wind, or of some irritating matter, such as accumulated feces, undigested food, acrid bile, overdoses of strong purgatives, or poison; it may also be brought on by exposure to cold. The pain of colic comes on and goes off suddenly, is of a rolling or twisting character, is referred chiefly to the umbilical or navel region, and is relieved by pressure; there may or may not be vomiting. In some cases of colic the spasmodic contraction of the bowel is so complete and permanent that inverted action takes place, and the fecal contents are vomited. The above symptoms distinguish colic from inflammation, the pain of which is of a more persistent, burning character, and is aggravated rather than relieved by pressure; in the latter case, too, febrile symptoms are present from the commencement. The distinction is, of course, requisite for active medical treatment; but many remedies, which may be used safely and effectually to relieve the one, will also be beneficial in the other, and, indeed, in other spasmodic or inflammatory attacks within the abdomen, which might be mistaken for colic.

The sudden onset of an attack of colic, its peculiarly painful character, and the danger that, if continued, it may pass on to one of inflammation, render immediate relief imperative. The first remedy is heat, either locally to the abdomen by warm fomentations, as hot as they can be borne, or by the hot bath of the temperature of 100°, if not undesirable on other accounts. The use of heat, if promptly and effectually carried out, will often of itself relieve the attack at once, particularly if it is the result of cold; but even should it do so, it will be well to give a dose of castor oil or rhubarb and magnesia, to insure the freedom of the bowels from irritating matter, a few drops of laudanum being added to either medicine should the spasm show a tendency to return. Should the pain not be relieved by the employment of external heat, as recommended, a warm enema, temperature 102°, should be administered, and a cup of tea or of some unstimulating fluid taken, as hot as it can be swallowed. If the pain still remains, ten drops of laudanum must now be given, and repeated every quarter of an hour, until relief.

Diseases of the Urinary Organs

How the Kidneys Separate or Excrete the Urine from the System and Throw Out and Drain Many Imperfectly Digested and Useless Matters Derived from the Blood

Subject Reference

For Venereal Diseases, see pages 227 to 246.

For Diseases of the Kidneys, Bladder and Urethra requiring surgical treatment, see pages 219 to 232.

Poisonous Matter Left in the Blood by Weak Kidneys is Often the Cause of Unsuspected Ill Health.

Excretion of Urine, Diabetes, Bright's Disease, Albumin, The Bladder, Chronic Disorders of the Bladder, Stoppage of Urine, Weakness of Bladder.

Sugar Diabetes.

Diabetes Mellitus (or sugar diabetes) is a disorder of nutrition in which sugar accumulates in the blood and is excreted by the kidneys. The amount of water necessary to carry off the sugar is large and the daily quantity of urine is greatly increased. The sugar is **grape-sugar**, and it is excreted for weeks, months or years, and not merely after the eating of much candy or sugary foods. It often runs in families. It is rare in children, though then very quickly fatal; most commonly it occurs between 20 and 60 years of age, especially among the well-to-do. Strong mental shock, close attention to business, overeating and drinking and sedentary occupation predispose to it, or it may result from injury to the brain or spinal cord, or from any of the infectious fevers.

Owing to the large amount of urine passed per day in sugar diabetes, this disease is popularly regarded as a kidney disease, but it is not. It is rather a disease of the liver, pancreas or central nervous system.

Symptoms.—The disease begins slowly and the first thing noticed is the greater frequency of micturition (or urination) and the great thirst. The appetite is excessive, yet the patient becomes thin. The thirst is most marked an hour or two after meals. There may, however, be little thirst and only an ordinary quantity of urine. The tongue is dry, red and glazed; the saliva is scanty; there is constipation; the skin is usually dry and harsh. There may be little loss of flesh, especially in elderly people. The disease is more rapid and the wasting more marked the younger the patient, as a rule.

There are apt to be boils, carbuncles, eczema, thickening of the arteries, or skin irritation; pneumonia is common as a final complication. Late in the course of the disease there may be unconsciousness, especially in children.

Treatment.—If there is a family history of diabetes, starchy and sugary foods should be restricted to a small amount. Worry must be avoided, the person leading a quiet, even life in an equable climate if possible, avoiding extremes of any kind. Silk or flannel should be worn next the skin and a lukewarm or cold bath should be taken daily, also systematic but moderate exercise. “Let the patient eat food of easy digestion, such as veal, mutton and the like, and abstain from all sorts of fruit and garden stuff.” The bowels should be kept open. See also Vol. 1 regarding diet in this disease. Opium is the only drug of value for it.

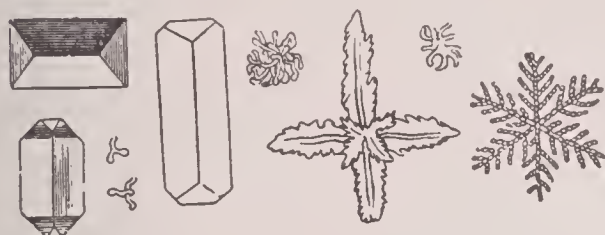


Fig. 314. Phosphates deposited in urine. Magnified.

Urine.—This is purely an **excretion**; that is to say, it does not, after its formation, fulfill any purpose connected with the living system before it is thrown out of the body; in this respect, it differs from the bile, which, although it is constituted of elements filtered off from the blood, yet certainly fulfills important uses in the digestive processes.

Quacks make much of appearances of the urine and often give their victims a drug which will color the urine. Thus methyl blue, given by mouth in a pill or capsule, will make the urine of any person, ill or healthy, a deep blue. That is very alarming to one ignorant of the simple cause. Beware of a “doctor” (quack) who advertises to diagnose your disease by examining a piece of paper, cloth, or anything else dipped in your urine and dried. He is a fraud!

The urine being separated or excreted solely from the blood, and being thrown out without serving any purpose in the living economy, must contain ingredients from which the body ought necessarily to be freed, and which could not be retained without injury; complete suppression of the fluid cannot continue above a few hours without symptoms of narcotic poisoning being developed, and death ensuing if the function be not restored. Urine consists of water holding in solution certain organic substances, and a proportion of saline constituents. The principal and most characteristic ingredient of the urine is its **urea**. Above half an ounce, on the average, of urea is excreted in the urine of an adult in the 24 hours; but in some cases, when rapid emaciation goes on, the proportion is greater, the urea being in fact a product formed from the used-up tissues of the body. Next in importance to the urea of the urine is its peculiar acid, generally known as **uric** or **lithic acid**. It is this acid which, when in excess, constitutes the yellow or red crystalline gravel, or “sand,” which is so frequent in many persons. This acid exists partly in combination with ammonia, forming what is known as the “lithate,” or “urate of ammonia.”

In addition to these two principal and characteristic constituents, urine contains various animal and coloring matters, also hydrochloric, sulphuric and phosphoric acids, in combination with lime, magnesia and soda, all these being derived from the blood. Further, there is always mixed with the urine a certain proportion of “mucus” derived from the bladder and urinary passages. Moreover, other

ingredients not natural to it, are apt to be intruded into this fluid, such as the albumen of the blood, or blood itself, pus or matter, oxalic acid, etc. The **average quantity** of urine secreted by the kidneys of a healthy man in the 24 hours is from 40 to 50 ounces, containing from 700 to 1,000 grains of solid matter. Both fluid and solid matters, as already stated, are derived solely from the blood; not, however, from the healthy constituents of the blood, but from those which have

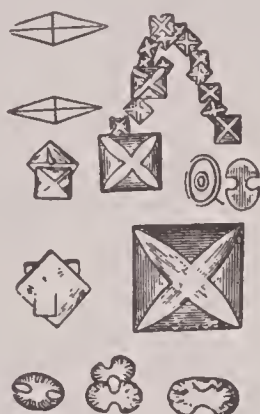


Fig. 315. Crystals of oxalate of lime in urine. Much magnified.

become "effete," which, having served their purpose in the economy, have been taken into the current of circulation, probably for the sole purpose of being brought to the excreting organs. Not only, however, do the kidneys separate the used up materials which have formed part of the organized frame, they also lay hold of, so to speak, and throw out from the blood, many ill-digested and useless matters which have been derived from the blood.



Fig. 316. Uric acid crystals deposited in urine. Much magnified.

In hot weather and in hot climates generally, when the action of the skin is so much increased, it of course leaves less fluid to be drained from the blood by the kidneys, and as the solids to be carried off by these glands still remain the same, or nearly so, the specific gravity of the smaller amount of fluid must be proportionally increased; here we have an obvious cause for the change, no less obvious than that which gives a large quantity of pale urine of low gravity if an individual indulges in fluids. Further, we know that nervous individuals of both sexes, and especially hysterical females, will occasionally secrete very large quantities of colorless urine. Such variations, therefore, cannot be considered to be the result of disease, but when permanent increase or diminution of the quantity

of urine occurs, without being accounted for, and especially if symptoms of constitutional disorder or debility, or of dropsy, show themselves, a medical man should at once be consulted.

Bright's Disease.—An affection of the kidneys in which albumen is always present in the urine. This symptom is characteristic of acute and chronic inflammation of the kidneys (*nephritis*), which are often termed *albuminuria*. Acute Bright's disease is by no means an uncommon complaint, being due sometimes to exposure to cold, causing a suppression of the cutaneous secretion; but it is far more frequently met with as a consequence of scarlet fever, and occasionally of measles and erysipelas. It may be caused by poisons. The symptoms vary with the nature of the attack, and are sometimes so slight as to escape observation; there is usually, however, a feeling of chilliness, with pains in the back and loins, and other febrile symptoms. Then appears swelling of the face, feet and legs, which frequently extends over the whole body. From the first the urine is loaded with albumen, and when heated in a test tube by means of a spirit lamp, it becomes first flocculent and then a solid mass. The urine also contains a little blood and casts of the tubules from the kidneys. In the most favorable cases, the amount of urine secreted is not much diminished, and the blood and albumen are limited in amount; but in the unpromising class, the reverse is the case. In professional hands, the treatment consists in aiding the action of the skin by warm and hot-air baths, and in keeping the bowels freely open. Diuretics only of the mildest character, such as linseed tea, barley-water, and tincture of *digitalis* are to be used.

The chronic forms of Bright's disease are far more numerous than the acute, the kidneys being subject to different kinds of degeneration, which are only discoverable after death. Apart from the albumen in the urine, there may be swelling of the ankles and eyelids, and the person may for months and even years have no other symptoms. Dropsy, however, sets in sooner or later, the swelling of the ankles goes higher and higher, and the urine decreases in consequence, the dropsy at last carrying off the sufferer. Death very often results from the urea of the urine accumulating in the blood, giving rise to coma, and sometimes to delirium; but the causes of death are very various, being sometimes assignable to the heart, occasionally to the liver and to the lungs, and, most frequently of all, to a collective influence of disease in various organs. If no serious complication occurs, recovery in the first stages of the complaint may be hoped for; but as the disease becomes developed, the prospect is very unfavorable. Bright's disease occurs at all ages and in both sexes, but it is more common after 40 or 50 than before that time, and may be traced to intemperance, exposure to cold and unwholesome atmosphere, and to the scrofulous tendency. Medical men can do little more in the way of treatment than relieve urgent symptoms of distress, since the disease is universally recognized as an incurable one. The dropsy is treated by medicines which have an action on the bowels, the skin, and the kidneys themselves, namely purgatives, diaphoretics, and diuretics. The diuretics used are more powerful than those employed in the acute stage of the complaint, and comprise nitric ether, broom decoction, and *digitalis*; the purgatives, epsom salts, jalap, cream of tartar, and elaterium, a powerful cathartic which is given in doses of $\frac{1}{8}$ of a grain. In the early stages (and in fact throughout the course of the disease) it is of essential importance that the patient be kept warm; and diaphoretics, such as Dover's powder, as well as the hot-air bath, are usually

recommended. Very little benefit results from tapping in Bright's disease, though it may be occasionally beneficial to give freedom to the fluid in the limbs by the insertion of an instrument like a darning needle into the parts which are most tense.

Albuminuria is the presence of albumin in the urine. It often exists quite unexpectedly and entirely apart from symptoms.

When the existence of albumin in the urine has been ascertained, its source and its significance must be investigated. A careful microscopical examination of the sediment is made. The condition of the blood vessels in the limbs and the character of the pulse should be noted, as also the previous history of the patient.

Albuminuria arises from a variety of sources, and its significance necessarily depends on the origin of the affection. (1) When it occurs in the course of some disease involving long-standing supuration, such as septic affections of bones or joints, it is probably due to change in the kidneys. If only an early stage of the condition is present, conservative measures directed to the treatment of the supuration will probably suffice; if, however, the affection has probably progressed some way, radical treatment of the diseased limb or part, such as amputation, should be undertaken to save the patient's life. (2) Albuminuria may be intermittent, and is then due to some temporary disturbance; this can only be ascertained by testing the urine from time to time. In such cases operation is not contra-indicated (or forbidden), the albumin usually disappearing with rest and careful diet. (3) When caused by chronic Bright's disease, the other sign of that affection will also be present in the shape of thickened arteries and high pulse tension, whilst possibly a certain amount of dropsy may be noted.

Tests.—The following are the chief: (1) On simply boiling, the urine turns a milky white; this is due to either albumen or phosphates. If due to phosphates, the whiteness disappears entirely on the addition of a single drop of dilute acetic acid; whilst if due to albumen, it persists. (2) Nitric acid added to albuminous urine gives a white cloud or light-brown flaky precipitate. The urine should first be boiled, and the acid added, but not too much, as the deposit may be re-dissolved. A more delicate test consists in pouring cold urine into a test-tube, and carefully adding the acid, so as to form a layer below the urine; at the line of junction of the two a white film is formed if albumin is present.

Diabetes.—The presence of sugar in the urine is also a matter of the greatest importance from a surgical standpoint, and its existence

or not should always be carefully ascertained. The chief tests employed are as follows: (1) Equal parts of solution of potash and solution of copper sulphate are boiled together, and then a few drops of the suspected urine added; if sugar is present, a yellowish-red precipitate forms; or (2) picric acid and solution of potash are mixed and boiled, and the urine added; the presence of sugar is indicated by the solution turning to a dark, blackish-red color. The presence of two grains of sugar to the ounce is sufficient to render the fluid quite opaque.

The effect of diabetes is very similar to that of albuminuria, in that it leads to diminished vitality of the tissues, and consequently slow healing of wounds. It also predisposes to the occurrence of sepsis, boils and carbuncles. Inflammation of the nerves and hardening of the smaller arteries may occur, inducing gangrene of the fingers or toes, in elderly people especially.

Bladder.—The urinary bladder is the receptacle for the urine, after it has been secreted by the kidneys and previous to its discharge from the body; it is an oblong membranous bag composed of three layers, or coats, the middle one being muscular. It is situated in the pelvis, just behind the pubic bone, rising, however, when much distended, into the abdomen. At the neck of the bladder, in the male, is situated the prostate gland.

Many diseases and disorders of the bladder are brought on by carelessness, neglect, or too great subservience to the conventional restraints of society; those persons especially, who habitually or necessarily are frequently compelled to restrain the desire, and forego for a time the relief, of emptying a distended bladder, are liable to affections of the organ. In early childhood, but sometimes even beyond puberty, the bladder habitually empties itself during sleep; night after night this occurs, and proves a serious annoyance, and expense, too, from the consequent destruction of bedding. The habit or disorder is sometimes extremely difficult, if not quite impossible, to eradicate. The regular use of the cold hip bath every morning is one of the most efficient remedies; and the tincture of the perchloride of iron, given twice a day, in 10-drop doses, in water, is often useful. Benzoic acid, and nitrate of potash are both said to have proved successful. In such cases fluid is to be taken only in small quantity in the evening. Malt liquor always increases the evil. Where the habit is inveterate, it is better to use one of the india-rubber urinals attached to the person, than to allow the patient to be a nuisance to himself and others.

Rupture of the bladder is almost invariably fatal. It is generally caused by blows or falls when the viscus is full of urine; but sometimes without violence, simply from overdistension. In the former case, intoxication is in most instances the first cause of the accident; the individual sits drinking till the bladder is quite full, staggers out to relieve himself, and either falls or stumbles against some object; the urine is effused into the cavity of the abdomen or surrounding tissue; agonizing pain, and extreme vital depression are the immediate consequences, and the patient speedily dies. In the latter cases, when the bladder is ruptured from overdistension without violence, it is generally caused by long retention of urine.

Strangury.—During the prime of life, the bladder is not generally liable to suffer from chronic disorder, except in persons of dissipated or intemperate habits, but one acute and very painful affection, strangury,—generally caused by the application of a blister,—is not uncommon. The affection is characterized by burning pain, extending through the urinary passages up to the neck of the bladder, accompanied with constant and distressing desire, and straining effort to pass urine, which will only come away in very small quantities, often mixed with blood. While it lasts, the condition is a painful and most distressing one. The means of relief are warm hip baths, demulcent drinks copiously taken, such as barley-water with gum arabic, linseed tea, etc. Warm injections, consisting of half a pint of gruel containing 20 or 30 drops of laudanum, give much relief; 20 drops of laudanum, or 10 or 15 drops of the sedative solution, may be given by the mouth, and repeated if requisite. When the patient is not in the bath, hot linseed meal poultices are to be used over the lower part of the abdomen. Enlargement of the prostate gland is a frequent cause of retention of urine amongst old people.

Stoppage of Urine.—With declining years, the bladder becomes more subject to disorder and disease; perhaps the most frequent affection is sudden inability of the organ to expel the urine. This may arise from its having been allowed to become over distended; from cold; from drinking hard malt liquor, or sometimes from external violence. The case is one of much distress and alarm, and being not devoid of danger, cannot be too soon placed under proper medical treatment. In the meanwhile, the person should be got into a hip bath, temperature 96°, and kept in it for at least half an hour, a warm bed being ready to receive him on coming out; hot bran poultices must be ready to be applied as soon as he is placed in it; just before entering the bath, a tablespoonful of castor oil with 10 or 15 drops of laudanum should be administered. It is not improbable that relief may be obtained by these means; but all efforts at straining must be avoided as useless and hurtful. Of course, drinking anything must be very limited or refrained from as long as the stoppage continues. Whilst the above measures are being carried out, medical assistance ought to be procured; for should other means fail, the introduction of the catheter must be resorted to, to save life. Nevertheless, the treatment recommended, if it does not prevent such a necessity, will certainly facilitate a sometimes difficult operation.

Weakness of Bladder.—Weakness of the bladder, and inability perfectly to retain the urine, is a frequent disorder of advanced age. It often commences with, and is accompanied by, imperfect emptying of the organ, either through carelessness or weakness. Sponging the lower parts of the abdomen, etc., with vinegar and water, or salt water, may be of service. Such cases should be placed under regular medical superintendence. The same may be said of that very troublesome complaint of old age, catarrh of the bladder, in which large quantities of thick mucus are discharged.

Stone in the bladder may be suspected when the urine is liable to become bloody after exercise, when there is pain in the bladder and surrounding parts, in the back and down the thighs, and when the stream of urine is apt to stop suddenly during the act of passing. Under such circumstances, proper advice cannot be too soon obtained.

INSTRUCTION FORTY-EIGHT—*Nervous System*

Diseases of the Nervous System

Neuralgia, Epilepsy, Saint Vitus Dance, Delirium Tremens, Hysteria, Locomotor Ataxia, General Paresis, Apoplexy, Melancholy, Hypochondria, Insanity, Lunacy, Mental Alienation, Unsoundness of Mind, Mania, Dementia, General Paralysis, Blindness, Sea Sickness, Spasms and Cramps.

Subject Reference

For the *Structure of Nervous System*, see Vol. 1, pages 56-72.

For "*Serious Advice to Teachers and Parents*" or "*General Principles of Nervous System*," see Vol. 1, pages 148-170.

Headache.

Headache (Cephalalgia) is one of the most frequent ailments, the result of a great variety of causes; consequently, there are many varieties of headaches. The subject will probably be rendered most clear and useful to the unprofessional reader by considering it generally under the divisions of—

Headache from overfulness of blood.

Headache from deficiency of blood, or debility.

Headache from excited or inflammatory action.

Headache from sympathy; and

Headache from nervous causes.

Headache is so frequent an ailment that people generally seem almost to forget its connection with so important an organ as the brain. There are, it is true, many transient slight headaches, and even severe ones, which do not call for much attention; but it must be remembered that there are others which it is dangerous to neglect; and an individual who becomes subject to headache, frequently recurring, should consult a medical man. This is more imperative from the fact that there is often considerable difficulty in determining the real nature and cause of some headaches, and that an error in this respect may, by leading to erroneous treatment, cause the most serious consequences. The most diverse line of treatment may be requisite, in two different individuals. The measures, in fact, which cure the one, may kill the other.

If a person who suffers from headache is of full habit generally; if he is sleepy, dull, the vessels of the face full; if the uncomfortable sensation in the head is aggravated by stooping, by an abundant meal, by stimulants, or by sleep, **overfulness** is the probable cause; he needs reduction of the diet, purging the bowels with calomel and colocynth, and with occasional doses of saline medicine, exercise and bathing the head with cold water. If the urine is deficient, cream of tartar in some form may be taken with advantage, and plenty of water should be drunk between meals. The above species of headache, the result of general overfulness of blood, may also be occasioned by whatever impedes the circulation, such as affection of the heart or liver; when the latter is the cause, the pain is frequently most severe at the back of the head. When, on the other hand, headache occurs in a person of weak constitution, when it is produced by or aggravated by exertion of mind, much talking, etc., when there is listlessness both of mind and body, rather than oppression—the face pale, the pulse weak—debility is the probable

cause, although at the same time there may be overfulness of blood in the head itself; very frequently, however, in this kind of headache the head is hot, without there being any particular flushing of the countenance. This form of headache also is frequently accompanied with indigestion, and is very common in students and anxious men of business. Anything like abstraction of blood will certainly prove injurious; but cold to the head may be of service, not only as a temporary remedy, but habitually used by means of washing with cold water. Exercise, attention to the state of the bowels, without purging, some care in diet, and relaxation of mind, particularly by means of change of scene and air, will be most useful. In such cases, the whole system is weakened—the brain and nervous system, the circulating system, the digestive organs—and they act and react on one another.

Headache from excitement or inflammatory causes, is such as occurs in the first stages of inflammation of the brain, and in some forms of fever, or it follows violence to the head. It is to be dealt with in connection with the special cause.

Sympathetic headache is very common, and is evidently connected with disorder in some organ of the body, such as the kidneys, womb, etc. Headache, sympathetic with disorder in the stomach or some part of the alimentary canal is, however, the most frequent form. The presence of bile, or of indigestible food in the stomach, almost certainly occasions dull pain in the forehead; an alkaline, or too acid condition of the contents of the stomach exerts the same effect. The various symptoms of indigestion will generally point to the cause. In the first two, an emetic, or some aperient, such as the compound rhubarb pill, or a stimulant, will probably remove the disorder. A vegetable acid, such as vinegar, many persons know from experience, will at once cure headache, especially if it occurs from the use of oily or greasy food; and again, when acid eructations, heartburn, etc., indicate the presence of superabundant acid, a dose of soda, potash, or magnesia will correct the cause, and remove the effect. Frequently, a brisk walk for half an hour will remove a bilious headache.

Headache is a symptom in many kinds of disease, especially at the commencement. It may also be due to the action of some poison in the system. Nervous headaches constitute a considerable proportion of the cases of headache generally, and most frequently owe their origin to a disordered condition of the nervous system, and are named from this cause brow ague, megrim, or hemicrania. Various remedies are used for this complaint, the most simple consisting of strong tea, coffee or guarana. Bromide of potassium, in doses of 15 or 20 grains, often cuts short an attack of the complaint. Brow ague often yields to large doses of quinine.

In general “headache powders” are dangerous and have often caused death. Most are aware of the cause, and consequently of the best mode of managing their occasional headaches. If the affection assumes a severe character, a medical man should invariably be consulted. It is often “reflex,” that is, it is due to a diseased condition in some other part, especially the eye. (See “Eye-strain” and “Asthenopia” in Vol. I.) Quite commonly the disease is in the nose (or one of its sinuses—hollow in bones that open into the nose) or in the ear.

Neuralgia—literally pain in a nerve—is also known as “rheumatism of the nerve,” or “tic douloureux,” this affection being by far the most common form of severe neuralgia usually met with. It is perhaps one

of the most painful affections to which the human body is liable. In most instances the pain is the only symptom; in some it is accompanied with marked constitutional or local ailment. The exact nature of neuralgia is obscure; probably, the one effect, pain in the nerve, may arise from a multitude of causes; it is certain that some of the most intractable cases have been connected with diseased growth of bone in different parts of the head or face, especially about the canals through which the nerves pass; other severe cases have been found to depend upon irritation, excited by foreign bodies acting upon some of the nerve branches; decayed teeth are not unfrequently a cause of the disease. The most general seat of neuralgic pain is in the head or face; but the fingers, the chest, the abdomen, etc., may be its site. When the great nerve of the leg is affected with neuralgia the disorder is known as *sciatica*.

The pain of neuralgia is described as "plunging," darting pain of the most intense and agonizing kind, but except in long-continued cases there is no external mark—no redness, swelling, or heat, to indicate the disorders to others. After a severe attack of neuralgia the skin is often left tender, and when the pain has recurred frequently, exquisitely tender swelling of the part has been known to come on. The occurrence of the pain is usually sudden, its remission equally so, and it is generally periodical in its attacks; it is suspended during sleep. The suddenness of the pain, its character—often compared to severe toothache—the absence of inflammatory symptoms, and its periodical returns, sufficiently mark the disease.

The exciting causes of neuralgia are, especially, damp and cold, or damp alone, if combined with malaria, such as causes ague; exposure to currents of cold air, especially if the individual is heated, frequently originates the disease; in this way, railway traveling has proved a fertile source of neuralgic affection. Debility of constitution renders the individual much more susceptible to those and other exciting causes; neuralgia has often, too, been traced to anxiety of mind. Some sudden attacks of neuralgic pain in various parts of the body have been traced to temporary stomach disorders, such as superabundant acid, and have disappeared as soon as the cause has been rectified.

The severe pain which attends neuralgia quickly drives the sufferer to seek medical advice; and without doubt the safest plan is to have the cause of the affection detected, if possible, and as soon as possible removed, before the disease has become fixed. If the person is resident in a climate or situation likely to excite it, some change should, if possible, be made; this will probably be most beneficial if the

removal be to a dry, warm air; but should disease have commenced in a cold, dry district, change to a moist, humid, but warm one, will probably offer most advantage. If disorder of the digestion exists, it must, of course, be rectified (see **Indigestion**) after that, if the disease still continues, quinine, given in large doses of from six to eight grains, every six or eight hours, will most probably be of service. Saccharine carbonate of iron, in from twenty to thirty-grain doses, is a most useful remedy, especially in weak constitutions; but these are constitutional curative measures which will be most safely trusted to medical hands. Blisters behind the ears or at the back of the neck are often valuable aids in the treatment of facial neuralgia. The late Sir Charles Bell is said to have found the following most successful in some cases of obstinate neuralgia, probably caused by disorder of the alimentary canal. One or two drops of cotton oil are mixed with one drachm of compound colocynth pill, and of this one-twelfth, or five grains, is given at bedtime, along with ten grains of compound galbanum pill. The remedy is more suited to persons of strong habit of body than to the weakly.

During the paroxysms or agonizing pain anything which will or is likely to relieve should be tried, even in the absence of a medical man. A sponge or piece of flannel dipped in boiling water and applied as hot as it can be borne over the site of the pain will often allay its severity or remove it altogether. A similar good effect is produced by the continued application of ice over the part; or, in extreme cases, chloroform may be inhaled, and will probably continue to give relief after its ordinary anæsthetic effect has passed away. Chloroform, belladonna, aconite, and opium, are all used as external applications in the form of liniment, to relieve the pain; and opium in the form of morphia is often given, by subcutaneous injection, or by mouth, in pills or draught, for a like purpose. Leeches over the pained part are frequently of service. Lastly, when other remedies fail, great benefit has been derived from the continuous galvanic current from a Lechancé battery administered along the course of the nerve. It is important to bear in mind that as neuralgia is most prone to attack persons whose health is under par, every care should be taken to promote the general health by tonics and exercise. Codliver oil, quinine, iron, and the bitter infusions, act most beneficially. Valerianate of zinc, in three or four-grain doses, in the form of pill, administered two or three times daily, has acquired much reputation in the treatment of hysterical neuralgia. There are, however, two or three modern remedies for neuralgia which deserve prominence. The one named above,

morphia by subcutaneous injection, is at once the most effectual and speedy. The next is phosphorus. It has been said that neuralgia is "the cry of a hungry nerve for phosphorus," and most certainly the supply of that important constituent of nerve-tissue is one of the most efficient curatives. Given in the form of hypophosphites it often answers well. Gelsemium is another remedy useful in special cases.

Earache is a form of neuralgia distinguished from inflammatory earache ending in abscess by the neuralgic characters already described. It is, of course, treated as neuralgia.

Epilepsy, or Falling Sickness, is one of the very afflicting maladies to which man is subject, belonging to the class of convulsive diseases. It is also one of the most eminently characteristic, and at the same time terrible to witness, when it occurs in its severer forms.

The fits, or convulsive seizures of epilepsy, are most varied as to occurrence; occasionally an individual has suffered from one paroxysm, and one only, the disease never again returning; in other cases, years have intervened; frequently the interval is one of months, but again, daily fits, or even two or three times a day, are the rule in the worst cases. The attack of epilepsy is for the most part sudden: the individual in the midst of some accustomed occupation, or while holding active communion with persons around, suddenly utters a loud—a fearful—cry, and, if unsupported, falls to the ground; the eyes staring or rolling, the chin is drawn toward one shoulder, the color becomes dark or livid, the veins of the face and temples turgid and the features are thrown into convulsive movement; there is froth at the mouth, while a kind of choking noise is often made in the throat; the limbs are also more or less convulsed, and the excretions are often expelled involuntarily. The tongue very often is bitten, and the teeth have even been fractured. Gradually, these convulsive movements diminish, and the person awakes to consciousness, with a heavy, stupid look, or falls into a deep sleep which continues for some hours; but even when this is roused from, there often remains dullness. Such are the phenomena of a severe epileptic paroxysm; the disease, however, occurs in much milder forms, even in those who at other times suffer from it in greater intensity. A slight temporary unconsciousness may be the only symptom, with or without the slightest approach to convulsive movement, as evidenced by the twitching of a finger, the roll of an eye, or slight spasmodic action of the muscles of the face; the patient may fall gently as in a faint, or remain standing, as it were, asleep for a few moments. This is known as **petit mal**, or minor epilepsy; the severer form is **grand mal**, or major epilepsy, in which the convulsion lasts from a few moments to the average period of from 5 to 8 minutes, but sometimes much longer.

The attack in many cases appears to by-standers to come on suddenly, and without warning; but most epileptic patients are sensible for some time previously of the approach of the paroxysm, and even for 24 hours are always aware that a fit is at least probable, although it may not be certainly known until just previous to its occurrence. It may happen that these symptoms will pass off without a fit, either independent of any effort of the patient to ward off the attack, or in consequence of some of those measures found to be efficacious, and adopted by epileptic

patients for the purpose. The patient may be quite unaware that he has had a fit or is subject to them.

The premonitory symptoms vary greatly: low spirits, or unusual irritability, sometimes an increased energy, dizziness, noises in the ears, floating specks before the eyes, and many other signs connected with disorder of the nervous system, are the occasional warnings of the epileptic paroxysm; but the most generally marked, and remarked, is the epileptic "aura," a sort of creeping sensation, which exists but for a few seconds, and is described by the patient as arising at some particular part of the body, such as the extremity of a limb, and gradually ascending upward to the trunk or head, till the individual loses consciousness in the convulsion.

Epileptic seizures are very frequent in the night time, just as the person is falling asleep; but they may occur at any period of the 24 hours, and may be induced by causes affecting the nervous system: the excitement of joy or passion, or the depression of grief, intoxication, and sexual excess are most frequent, not only actual excitors, but also predisposers, to the attack of epilepsy.

Epilepsy may be a congenital disease, that is, the child is born with the tendency, and becomes subject to the fits, either with or without apparent cause, early in life, indeed, many of the convulsions of children occasioned by teething, etc., are in fact epilepsy, but as they arise from causes irritating the brain, and not from affection of the organ itself, they are possibly not repeated when the cause of irritation has subsided. If, however, the tendency exists strongly in the constitution, and has not developed before puberty, it is very apt to do so at that period, and more especially if favored by circumstances which lower the tone of the body generally, or of the nervous system in particular; but no period of life is exempt from becoming the period of epileptic development, even to old age. Of the causes of epilepsy, **hereditary disposition** comes first on the list, then follow in order **dentition, fright, mental anxiety, and excitement, blows and falls on the head**; but in a very large proportion of persons subject to the disease, it is difficult to trace the true cause, which may be of a more or less complex character.

A person may die in an epileptic fit, even in the first, but this is seldom the case; more generally the disorder does not immediately threaten life, but the individual goes on from year to year, suffering more or less, and still lives; even when the fits occur daily, or two or three times a day, this is the case. When death does occur early in the disease, it is more probably due to suffocation arising from the spasm of the muscles of the throat and neck, than to the brain affection. But if life is continued to the confirmed epileptic, too often intellect becomes affected. This may not be palpable after a first seizure, not even after many seizures for many years, not throughout a tolerably long life, but these are exceptions. The generality of epileptics become feebler in intellect, the memory fails, the power or continuous exertion of the mind is lost, and perhaps, at last, the condition ends in loss of reason.

Epilepsy is due to disorder or disease of the brain and nervous system; the affection either directly originating from them, or through them, in consequence of irritation in some portion of the body. Arising, either directly or indirectly, from the nervous system, whatever weakens that system tends to cause epilepsy. From this it is evident how well founded the observation is, that there is no more fertile source of epilepsy than the abuse of the sexual organs, particularly in the young. The subject is a painful one, but the direful consequences of vice, with which the merest children become imbued at school, is frequently coming before

medical men; unaware of the sin and evil consequences of their acts, they ruin constitutions at the most critical period of life, and lay the foundations of epilepsy and other nervous diseases, which are either quickly developed, or do not show themselves till late in life. The subject is one to which parents and tutors cannot be too strongly alive. Children should be given plenty of healthy occupation and play and should not be left much to themselves unobserved. Alcohol is a cause of epilepsy, and delirium tremens may be complicated with it. Strong and prolonged mental exertion may induce epilepsy. Fright is another and very frequent existing cause. Worms and irritations in the bowels, indeed, whatever can irritate the nervous system, may induce the disease in question. Imitation, or at least the witnessing of an individual in the epileptic paroxysm has been known to give rise to the fits in others, but they were most likely predisposed, or at all events of nervous and susceptible temperament; for this reason, such persons, young females and children especially, should never, if possible, be permitted to witness an epileptic fit; the premonitory cry is so terrifying that it has been known to affect even the lower animals.

From what has now been said, it must be evident that epilepsy is no disease for domestic management in a curative point of view.

In families in which a tendency to epilepsy is known to exist, the greatest care should be taken to guard the nervous system from all causes either of irritation or exhaustion. In infancy, the period of teething, and the condition of the bowels, will require special attention, and the general health to be kept as good as possible. The physical strength and health are to be cultivated in early life, even at some sacrifice of educational advancement; at puberty, the strictest eye must be kept upon the habits and tendencies, and while the constitution is developing, and growth going on, all exhausting exercises prevented; indeed, during life the suspicion of a tendency to so terrible an affliction as epilepsy should be a salutary check upon excess in every way—a check upon the man who consumes his energies in the exertions of business or of study, as well as upon those who waste them in the pursuits of vice or sensualism. In addition to passive preventive means, all those measures which are fully laid down throughout this work for the preservation of health should be well attended to, particularly the use of cold water to the head, spine, and surface generally, if there is sufficient reaction to bear it.

Certain precautions are always requisite with those who suffer from epilepsy, and as a general rule it may be laid down that they should never, if possible, place themselves, or be placed in situations in which a sudden seizure will expose them to danger. Thus, employments which necessitate riding on horseback, ascending heights (as climbing a ladder), etc., ought never to be engaged in, neither such as those in which even momentary unconsciousness may involve the lives of others in danger. Even the suspicion of epilepsy in a railway official ought to be a disqualifying circumstance. Many, it is true, have sufficient warning to enable them to prepare for the attack, and to withdraw from danger, but this is not always possible; when means will allow of it, the epileptic ought to have an attendant constantly with him. When an individual is seized with a fit of epilepsy, but little can be done for its immediate relief; the chief thing is to prevent the patient inflicting injury upon himself, by striking against surrounding objects, and also to protect the tongue. Those who are much in attendance upon the epileptic, ought always to have at hand a piece of india rubber, or a thick india rubber ring—such as is used for children teething—to insert between the

teeth. All fastening about the body, such as the neckcloth, etc., ought to be loosened, and air freely admitted; the head should be raised, and cold wet cloths may be applied to it if there is much heat. The person should be placed on the ground or floor, and the bystanders forbidden to give him anything so long as the fit lasts. Much harm is done at times by attempts to make the patient swallow fluid, such as water or spirits during the fit, but all attempts of this kind should be postponed till after his recovery from the fit.

The treatment of an epileptic patient in the intervals of the fits, involves too many considerations to be advantageously managed by anyone but a doctor: when well treated, there is a hope of a cure, and this chance should be afforded to the patient. The bromids of potassium, of sodium, and ammonium, taken in large doses (5 to 60 grains) or as much as is necessary to prevent fits have been found very efficacious. A large dose should be given just before the usual time of a fit when these are regular. Tonics such as steel and cod-liver oil, with attention to the general health and surroundings of the patient are very necessary. Epilepsy is often a feigned disease, particularly among soldiers and sailors, and also by mendicant impostors. The latter usually choose public places for the exhibition, throw their legs and arms about, foam at the mouth with a little soap mixed with saliva, and continue their exertions for a much longer time, and with more expenditure of force, but with less active power than the real epileptic. A real epileptic is not susceptible to pain or sensation; where suspicion exists, therefore, some test of this kind which will not injure may well be tried. Snuff may be put up the nostrils, and if it produces sneezing there is no epilepsy: sometimes the proposal, within hearing of the person, to try some mode of treatment which involves considerable suffering is sufficient to dispel the fit. In the treatment of the disease the careful regulation of the bowels is of highest importance. Patients often remark that the fits are less frequent when attention is paid to this particular.

Saint Vitus' Dance, or Chorea, is a nervous disorder; its precise nature, however, is at present obscure. Probably it may be occasioned by direct causes seated in the great centers of the nervous system, or by indirect causes, which act by "reflex action" in the same way that teething in infants produces convulsion; that is to say, irritation in some portion of the body, as in the bowels, may, in the first place, give rise to irritation of the brain and spinal chord, which irritation acting as if its original seat was in these great centers, is "reflected" on the body generally, or at least upon some portion of it, causing the irregular muscular movements of the disorder in question. St. Vitus' dance is, for the most part, a disease of youth, occurring before puberty, and usually disappearing at that period of life, if it has continued so long. It is more common in girls than in boys, in proportion of three to one. It may, however, continue into adult life, but rarely occurs after 20. It rarely proves fatal.

The most manifest symptom of St. Vitus' dance is **continued involuntary action of the voluntary muscles**, to a greater or less degree. The extent of the muscles affected, and the intensity of their affection, varies with the severity of the disease. The movements, however, generally cease entirely during sleep, and in all cases certainly are diminished. The ordinary voluntary movements are still capable of being performed after a fashion; that is, in an unsteady, uncertain, and sometimes grotesque manner. It seems as if, after the voluntary impulse had

been communicated to them, an additional involuntary one interfered to throw the limb or other part out of the usual steady movement.

The disease generally commences with twitching about the face or neck, or in a particular limb, gradually extending to the whole of one side of the body, and in the vast majority of cases, ultimately involving the whole body. Pain is seldom complained of, but it does sometimes occur in the head. The appetite may remain quite good, the bowels may be confined. To this depraved state of the bowels, or to **constipation**, or to the presence of **worms**, the disease is often traceable; in females it is not infrequently connected with the menstrual function, especially if it be delayed or imperfect. The **coming of the second teeth** may be a cause; and there is no doubt that **imitation**, especially among females, may spread the disease, which is most general, as might be expected, in persons of a nervous tendency. The duration of the attacks varies from 10 days or a fortnight to months; but having once existed, it is, up to the age of puberty at least, apt to recur.

The best plan of treatment is as soon as possible to submit the case to a proper medical examination, for, as already explained, it may be dependent merely on some casual irritation, which skill will at once detect and remedy. The disease, moreover, is one which is usually devoid of danger, and while there can be no question that many cases of it will get well without any treatment at all, there are others in which the cause and true nature of the malady can only be satisfactorily elucidated by a medical man.

In any case no harm, but almost certain benefit, will result from acting on the bowels freely, more moderately, of course, in a weak subject than in a strong one. For this purpose, the compound colocynth pill simply, or combined, one for two or three nights in succession, with calomel or blue pill, will be of service, or the blue pill and black draught, or compound decoction of aloes draught, may be given. After the bowels have been well cleared, if the subject of the disease be weak and pallid, **iron** will be required. The red carbonate of iron has been found extremely useful in large doses, from a drachm upward, given twice or three times a day; other preparations of iron, however, may be given, or quinin. In all cases attention to the general health is required. Good diet, exercise, change of air, plenty of sleep, and free ventilation of sleeping rooms, are all necessary.

Delirium may be the effect of disordered or inflammatory action affecting the brain itself, or it may be sympathetic with active disease in other parts of the body, such as the heart or kidneys, or it may be caused by long-continued and exhausting pain, and by a state of inanition of the nervous system. In the treatment and alleviation of the symptom, it is of the highest importance that it should be ascertained to which of the above conditions it is owing, and from this circumstance, any attempts to remedy it by the unprofessional—who must be liable to error on this head—cannot but be attended with great risk. It may, however, at times be requisite even to run this risk, for the chance of doing good, and then the following directions may serve as some guide:—

When delirium occurs in a person of full habit of body, accom-

panied with inflammatory fever, with quick strong pulse, bloodshot eye, and flushed countenance, abstraction of blood in the first instance, either from the arm, by leeches, or by cupping, cannot fail to be of service; free purging with calomel, combined with compound colocyath pill, with jalap or scammony, or followed by senna and Epsom salts, should be resorted to; the head should be shaved and kept cool, with the coldest applications to be procured, the feet should be kept warm, the room darkened, and every source of excitement removed. If there is violent effort, and unruly conduct, the limbs must be restrained firmly, but gently, whenever attempts to exercise them in an improper manner are made. In this case a broad belt passed loosely over the bed, and fastened at each side, so as to confine only when any attempt at rising is made, is of considerable assistance. In this form of delirium, it is of the most essential import that watch should be kept without one moment's interval, night and day; there must be no risk run of sleepy attendants, and there must be sufficient physical power to restrain the almost superhuman, though transient, efforts made by delirious patients. Some of the most painfully distressing accidents of illness have occurred in consequence of neglect of these precautions; one unguarded moment, one five minutes' sleep, have neutralized days and nights of anxious care and watching; in the brief interval of remitted surveillance, the patient has escaped from bed, from room, even from house, by the usual modes of egress, or has dashed madly through the first window in his way, or laid hold of the first means of self-destruction. The force of the excitement, it is true, is generally soon over, but it lasts long enough for serious or fatal mischief; no apparent quiet for some time is to be trusted; unceasing care must be exercised till intelligence returns.

In the low forms of delirium, the mental disturbance is equally complete as in the acute forms, but the violence of the inflammatory fever is absent; generally, the person lies in a dreamy state of incoherent thought; but even in this form, occasional fits of excitement, and attempts to get out of bed, and the like, occur, and must be guarded against. It is this form of delirium which generally becomes developed in the progress of typhus and typhoid fever. The temperature is scarcely so high as in the inflammatory attack, the vessels do not throb in the same manner, and the eyes are not bloodshot, the pulse is feebler and more easily extinguished, the tongue and the hands are tremulous, the former when protruded, and the hands are perhaps affected with convulsive startings. When these symptoms are at all marked there can be but little doubt as to the nature of the case. To

take away blood is to kill; the head is to be kept cool, the bowels moderately, but sufficiently opened, and the warmth of the feet attended to, perfect quiet being observed around the patient. In such a condition, particularly if there is tendency to nervous or convulsive twitching of the fingers or of the tendons at the wrist, opium may certainly be given with benefit; the dose for an adult fifteen drops in the evening, five drops additional being given every two hours till sleep is procured, or till thirty drops have been administered in all; or the muriate of morphia may be given, in half or quarter grain doses, in the same manner; or in the absence of these, any other preparation of opium in corresponding quantity. The hydrate of chloral in doses of ten or fifteen grains may often be given with advantage to procure sleep, when it is not advisable to use opium. Sleep is the only remedy for the irritation and irritable exhaustion of the nervous system which is attended with this form of delirium, and opium is mainly to be trusted to for procuring its benefits. Strong meat soups, and wine, may also be requisite, but the consideration of these matters rather belongs to the subject of fever.

A form of delirium, accompanied with much nervous irritation, is apt to be developed in the course of scarlet fever, towards the third day of the eruption, or when it is beginning to fade. In the progress of rheumatic fever this same delirium of exhaustion may occur, and, like the others already mentioned, requires the treatment by opium.

Delirium, due to injury, takes either of the above forms, according to circumstances, but it is more generally the low type, especially when consecutive to severe accident or operation, or during protracted child-birth; generally, therefore, opiates and supporting measures, meat, broth, wine, and bark, etc., are required, rather than the reverse.

It is of consequence that delirium should not be mistaken for insanity, as it might be and has been, but scarcely ought to be by a medical man. The concomitant circumstances of disease, etc., will generally guide. In true delirium the presence of fever more or less, the acute disorder of the functions generally, such as digestion, etc., and the disorder of the whole mind, generally sufficiently indicate its distinctness from insanity, in which the faculties of the mind are only perhaps partly affected or perverted, and disconnected. The insane, moreover, do not exhibit the appearance of illness which accompanies true delirium, and the functions are not usually impaired in the same way. Still the two affections may nearly approach one another, and in the form of delirium which follows child-birth or the delirium tremens of the drunkard, it may often be difficult to make the defini-

tion as to which the case belongs. Still more difficult of discrimination are some cases of hysterical delirium, which, when long continued, might well be mistaken for insanity, unless submitted to medical judgment; indeed, in every case of delirium, medical assistance should be procured as early as possible. No unprofessional person should think of treating a case of delirium, when professional assistance is at hand.

Delirium Tremens consists of a peculiar exhausted condition of the nervous system, which is accompanied with more or less mental disorder of a peculiar kind. This disease is generally the result of excessive continued intoxication with whisky ("D. T.'s"), or of their withdrawal when they have been habitually consumed in considerable quantity; it may also, however, be produced by the continued use of opium, and has been known to arise from other causes of cerebral exhaustion. The first symptoms of delirium tremens is a state of restless nervous irritation, if the exciting cause be continued, sleeplessness follows, there is no rest, and if there is any approach to sleep, it is haunted by dreams and figures, which seem to excite the greatest terror; the mind is more collected than in most other forms of delirium, but seems always to be more or less haunted with suspicions of those around. The entire frame is in a state of tremor, the closed eyelids and the protruded tongue are tremulous; the hand which attempts to perform any action requiring exactness, cannot execute it for shaking; the patient is exhausted, and still sleep does not come. Succeeding the above condition, the nervous excitement becomes so great that the person cannot be kept in bed, the mind becomes more disordered, a state of temporary insanity ensues, and convulsions, epilepsy, or apoplectic stupor close the scene; a scene of the most painful nature, perhaps, which the physician is called to witness—the death-bed of the drunkard—of the man slain by his own suicidal act, by the poison of alcohol.

Delirium tremens often supervenes in cases of injury, and tends greatly to complicate the cure, especially if the injury happens to be of a serious nature. It may continue for three days or four days or even longer, though it usually succumbs to the remedies prescribed by the doctor.

It can rarely happen that an unprofessional person could have to undertake, unassisted, the management of a case of delirium tremens, and never should do so, except under extreme necessity. The nature of the disease is, unhappily, in almost all cases too palpable, from its exciting cause. It is an exhausted condition of the brain and nervous

system, and the great effort must be to alleviate this exhaustion, too great even for sleep. Opium is the remedy among others, and must be given in full doses. A medical man will of course give it more freely at once than another person; but in a confirmed case of delirium tremens, thirty drops of laudanum should be given at once, and repeated until sleep has been procured. Should the opium fail to give relief, twenty grains of chloral, either alone or combined with some aromatic stimulant, may be given and repeated at intervals. It often happens that the stomach is in so irritable a condition that it will retain neither food nor medicine; in such a case, the opium is better given by hypodermic injection, and repeated should the occasion require it, but the person should be carefully watched, lest the narcotic should produce a too powerful effect. In some cases of delirium tremens, the liver is more or less affected, it is loaded with dark unhealthy bile, and so much is this the case that some have been inclined to attribute many of the symptoms of delirium tremens to the liver disorder, and to recommend a purgative treatment in preference to that by opium. The medium course is the best; that is, the combination of opium with calomel, and the compound colocynth pill. Five grains of powdered opium, ten grains of calomel, and twenty of compound colocynth pill, are to be compounded together and divided into twelve pills; of these, two or three should be given for the first dose, and one at intervals of an hour between each, till six have been given. Under this treatment, after sleep has continued for some time, the bowels are generally acted upon, with immense discharge of dark black-looking bile, much to the relief of the patient. After this, the remaining pills may be given, two every night, and castor oil in the morning, if required; five, ten, or fifteen drop doses of laudanum, or two teaspoonful doses of paregoric being given if the nervous irritation is unsubdued, or threatens to return. After the nervous irritation is tolerably well subsided, the next object must be to restore the tone of the stomach. Eight-grain doses of the carbonates of soda, or potash, combined with a tonic bitter, calumba, gentian or chamomile, may be given for this purpose, every eight hours, or quinine or bark, in some form, will be found useful. Bitter beer, with ten drops of potash solution, may be very serviceable. During the whole treatment it may be necessary to allow the unfortunate subject of the disease a **certain regulated** portion of alcoholic stimulant, such as brandy and water, in some degree proportioned to the previous habits, and as soon as the stomach will bear it, the nourishment of strong meat broths, yolk of raw egg, beat up with a little

brandy, or gruel or arrow-root, with brandy, should be given. If the tongue is very red at the tip, and if the pit of the stomach is very tender, milk, with or without the addition of a little brandy, should be substituted for the above; fifteen drops of solution of potash, or one or two tablespoonfuls of fluid magnesia or of lime-water, may be added to the milk with advantage. In cases of persistent sickness, effervescing draughts, and ice given in small, frequently repeated fragments, are often useful. The reception of nourishment by the system is of the highest importance in this disease; so much, indeed, is this the case, that as long as a man continues to take food freely he is not likely to become the subject of delirium tremens. The necessity for the continuance, in reduced quantity, during the treatment, of the stimulant which has produced the disease, is evidenced by the fact that many cases of delirium tremens are precipitated, at least, by the sudden withdrawal of the accustomed excitement, and relieved by its renewal; and for the same reason the radical removal of this fearful disease, or indeed of intemperance generally, though it can only be effected by the abandonment of the pernicious habit, must in many cases be conducted with extreme caution, otherwise dangerous or fatal consequences may result. Undoubtedly, men of naturally good nervous power, whose stomachs still retain some of their pristine tone, and can receive and digest food in tolerable quantity, and where the constitution has not been thoroughly sapped by intemperance, may, and do with impunity and benefit abandon at once their habits of drinking, and when this can be done, it is the safest and most certain plan; but many cannot do this without risk, and must go more cautiously to work. Where spirits have been consumed, let them be exchanged for wine or malt liquor, in reduced and reducing quantities. At the same time, with all who are endeavoring to break through the evil habits of intemperance, some innocent and rational excitement ought to be substituted for the pernicious one; excitement of mind or body of some kind must take the place of that which has been abandoned, if the full benefit of the change is to be derived.

Many methods have been devised for gradually weaning the intemperate from the craved excitement; perhaps one of the most feasible is that of commencing with a certain quantity of the accustomed stimulant, taking from it a measured proportion only every day, and for every measure withdrawn, substituting an equal quantity of water. The plan is a good one, but no plan will succeed without the firmest determination of the drinker to conquer the vice which is dragging him to ruin in this world and the next. If he will make this resolve, and

pray to Him who alone can strengthen and uphold man's feeble will, then may he hope to overcome. Again it is repeated, the intemperate man, whose constitutional powers will enable him at once and without compromise to cast aside the vice, has the easiest task; but no man should do so except by medical sanction, and the further advanced in life, and the more confirmed the habits of the patient, the more necessary does the precaution become. But in any case in which a person, who has been in the habit of taking alcoholic stimuli, abandons the custom, he should be under medical surveillance for a considerable time after; otherwise, formidable depression of some or all of the vital functions may be the result.

The question of restraint in cases of delirium tremens is one of much importance; at times it becomes absolutely necessary to exercise it, for the preservation both of the patient and of those around. When the necessity does arise, it must be put in force with as much gentleness as may be compatible with firm command. The individual suffering should be kept in a bed where there is room for persons to be on each side, and all efforts at violence should be restrained by **perfectly adequate physical** power in the attendants. It is not necessary to keep the hands constantly upon the patient; if he knows—and he is generally conscious enough for this—and feels that he is mastered, he will remain quiet; but if by the temporary absence of an attendant, he thinks he can overpower the others, he again becomes unruly. This consciousness of hopeless effort on the part of the patient is in many cases the most powerful means of restraint. A strong webbing band made to cross over the bed about the middle, and to buckle at one side, is often extremely useful in checking sudden violence, whilst it ought to be sufficiently loose to prevent any feeling of restraint, such as the straight waistcoat gives rise to, thereby irritating the patient to a great degree, and inciting him to ceaseless and exhausting efforts to get free; the latter should never be used except under great necessity. The question of permanent restraint, where repeated attacks of delirium tremens occur, and where the patient is continually in a condition verging upon insanity, is a very puzzling one, in consequence of there being no asylum adapted for such cases. The person when at liberty will drink, and when he drinks he is mad; but when sober, or nearly so, his mind is not sufficiently affected to class him with the insane.

The difficulty of dealing with such cases is often extreme, both to the family of the patient and to the medical attendant. There may, it is true, be procured a keeper or guardian, but comparatively few

can incur this expense, and it is but an insufficient safeguard after all; the consequence is, that numbers of such patients are kept at home; they cannot be prevented from indulging their irresistible propensity to intoxication, and so, for a longer or shorter time, they are a source of danger and of terror to their family and to everyone around, and run hourly risk of terminating their own miserable existence by a more speedy description of suicide than the one they are following. It is much to be regretted that no proper provision is made in this country for the reception of such cases, which cannot properly be transferred to a lunatic asylum; for no sooner is the stimulant withheld, or regulated, than they become restored to sufficient intelligence, at least, to make them unfit inmates of the place.

Hysteria is a disease of the nervous system. It is, almost without exception, peculiar to females between the age of puberty and the fiftieth year of life. The affection is very rare in the male sex.

Hysteria in the female is closely connected in sympathy with the womb and its functions, and few cases, perhaps, occur in which there cannot be traced some disorder of this important organ as the exciting cause.

Hysteria may manifest itself particularly in three different modes. First, either as a pure nervous and spasmodic affection; second, as a simulator of other and more directly definable disease; and third, as a modifier of other diseases really existing. The varied forms of hysteria, and the way in which it modifies and masks, or closely simulates other more important affections, is apt to render it at times one of the most puzzling disorders with which the physician has to deal; it is one, moreover, especially liable to mislead the young or inexperienced practitioner.

A fit of hysteria may assume different forms, but, generally, the female becomes, **apparently** of a sudden, partially insensible, it may be, falls down, but more generally has sufficient warning to seat herself on a chair; the eyes are closed, the lids tremulous, the limbs are stretched out, and spasmodically and suddenly contracted at intervals, or there is violent struggling, the chest heaves, the heart and vessels of the neck beat violently, the face is more or less flushed; frequently, the patient puts the hand to the throat and neck, and not uncommonly gives utterance to incoherent or disconnected sentences, generally in a peevish or distressed tone of voice. In most cases the power of supporting the body when seated remains, unless it is worked off the chair in the struggles. At length, the attack, having lasted for a longer or shorter period, from a few minutes to some hours, terminates, probably with a fit of sobbing and crying; the patient recovers consciousness, but is left exhausted and fatigued with the efforts and struggles, and, perhaps, falls into disturbed or heavy snoring sleep. When a fit has terminated, or even during its progress if continued, the kidneys act very freely, and large quantities of urine, almost resembling pure water, are voided.

Such are the leading features of a "fit" of hysteria, but they may be greatly varied; the struggles, especially, being so violent as to require the assistance of two or three strong men to restrain a comparatively feeble female, and to prevent her injuring herself, and sometimes, though not commonly, those around her.

Such are the outward manifestations of a fit of hysteria; but before it comes on, many patients complain of a sense of general oppression or uneasiness, with coldness or numbness of the limbs. Just previous to the attack, the characteristic hysteric "globus," or ball in the throat, is probably felt; it seems as if a ball commenced rolling upwards in the bowels, generally from the lower left side, and as if it kept gradually ascending toward the throat, which it seems entirely to fill up, causing those sensations which induce hysteric patients so often to carry the hand to, and pull at the fore part of the neck or throat.

There is scarcely a disease to which the human body is liable, which it may not resemble so closely as to call for all the tact and discrimination of the physician to detect the difference between the two. Continued, *incessant*, hard cough, loss of voice, delirium of various kinds, paralysis, contractions of the limb, obstinate vomiting or constipation, nay, even pregnancy, are some of the various simulated conditions. It is a matter of importance that not only parents, but that the individuals themselves should be aware of those habits, etc., which tend to develop the hysteric tendency; and, further, that the best mode of managing a hysterical individual during the fit, and in the absence of a medical man, should be understood.

During a fit of hysteria, little either need or should be done, beyond preventing the patient hurting herself during the struggling. Cold water dashed upon the face may be useful, or it may be poured in a stream upon the head for a few minutes at a time, from a large jug; literally putting the patient under the pump is the best remedy. If there is much flatulence, a teaspoonful or two of sal volatile in water will give relief. It must be remembered, that in most cases of hysteria, the patient is sensible of what is going on around, and may, in the excited state of the nervous system, be painfully alive to any unguarded or unfavorable opinions uttered by those in attendance; for this reason, it is not to be recommended that, as sometimes is done, severe and violent remedies should be proposed within hearing of the patient with the view of frightening her out of the fit; such a course has had the opposite effect, causing an aggravation of the symptoms. This is a different thing from threatening severe remedies for patients comparatively well; such a plan of treatment, it is well known, has often succeeded in putting a stop to the spread of hysteria—by imitation—through schools, or similar gatherings of young females.

The exciting causes of hysteria are whatever tends to exalt the influence of the nervous system. Among the moderately-fed and hard-working population in the country, hysteria is comparatively rare, but it is not unfrequent in servants who remove from the poor living of their own homes to the stimulating diet of a rich man's house. Most generally, hysteria, although in some degree the result of constitutional tendency, is connected with debility, and irregularity of the usual conditions of female health, all these being aggravated by emotions of the mind, particularly those which are connected with the affections; these, too, when in direct excitement, as well as inordinate physical exertion, which produce exhaustion of the nervous system, must be ranked as among the most general direct causes of the hysterical fit itself. If, however, mental influences either of excitement or of depression, connected with the affections, are apt to occasion hysteria, excitement of another kind has been found to be one of the best counter-agents of the morbid tendency. It has been remarked, that amid states of great public agitation, such as revolutions, hysterical affections have decreased in frequency;

and instances often occur, of women subject to frequent attacks of hysteria as long as easy circumstances permitted self-indulgent habits, losing the tendency when reverse of fortune or some other cause has forced them into active exertion. Under these circumstances, it is not to be wondered at if marriage, with its new cares and duties and interests, often cures hysteria.

The prevention of a disease, or of the tendency to it, must ever be the most important consideration connected with it, particularly when, as in the case of hysteria, prevention is quite possible. There is much greater frequency of hysteria among those classes whose mode of life is comparatively indolent and luxurious, being, in fact, that best calculated to **develop** those hysterical tendencies, of which the **foundation** is too often laid in the absurd education of the girl. Those who would not have their daughters grow up subject to the miseries of "nervousness" should use the rational means of developing their physical health, and give them those habits of healthful exertion, both of body and mind, which, carried up into womanhood, will be the best preventives of hysteria, with its long train of exaggerated ideas and exaggerated ailments, which are too apt to render single life useless and a burden, and, if long continued, to make weak mothers and nurses, if marriage is entered into.

As regards the treatment of the hysterical tendency, it is needed to say but little beyond the enforcement of those **general means of health** which are laid down. As regards medicinal treatment, it requires to be so varied according to each particular case that it can only be rightly conducted under the care of a medical man, and long continued.

Lastly, although hysteria may be dependent on physical derangements, it must be considered as a disease to a considerable extent **under the control of the will**, and this fact should be strongly urged upon the subjects of it, even when they are sufficiently sensible, as they most generally are, during the existence of a fit of the disease. Hysteria is a disease which lives and grows on excess of sympathy and attention, and whilst all kindness and consideration is shown, it is wonderful how much good may be derived from a little wholesome neglect and constant firmness; not abuse, however, but just insisting on sensible behavior. The medical treatment of hysteria should be committed to the medical man, but there is always much tendency to a confined and, consequently, loaded state of the bowels, which it is highly necessary should be avoided. The compound colocynth or compound rhubarb pills, compound decoction of aloes, infusion of senna, or enemata, will be found the best adapted aperient remedies.

Locomotor Ataxia—Tabes Dorsalis—is a chronic, progressive hardening of the spinal cord, caused by syphilis or the excessive use of alcohol. Sexual excesses, over-exertion, and exposures are also said to be causes.

Symptoms.—Early there are darting pains in the legs. The eyelids may droop, sometimes the patient sees double—sees two of everything instead of one. There may occur total blindness. The knee-jerk is lost, i. e., the foot is not thrown suddenly and involuntarily forward when the knee is struck as the leg is resting upon the other knee. Normally this should occur, if the knee is struck with the edge of a wooden ruler in the right place, on the strong tendon passing

down from the knee cap. There is usually a gradual loss of sexual power, and the disease may not progress beyond this stage. When there is blindness the power of walking is less affected.

Later the patient notices difficulty in keeping his balance when walking in the dark. Standing with the feet together and the eyes closed, as in bathing the face, is impossible—at least without great swaying. Descending stairs becomes difficult and dangerous. The patient has a peculiar gait, with the legs wide apart; he lifts the foot higher than necessary and puts down the heel first, or the entire sole. There may be attacks of very intense pain in the stomach. Finally the limbs become paralyzed and the patient becomes bedridden. Some other disease then usually attacks the weakened body and death ends the sufferings. Complete recovery never occurs, but the progress of the disease may be arrested. Usually death occurs from some intercurrent disease.

The patient should live a quiet life and keep at his usual occupation as long as possible. His diet should be nourishing, and life as pleasant as possible. For the pain, morphine may be used, and rest in bed, with a mustard plaster to the back. Nitroglycerine is sometimes of service, but as a rule drugs are of little value.

Paralytic Dementia—General Paresis.—This is a disease of the brain which occurs most commonly in men between the ages of thirty and forty-five. In a large majority of cases it is a result of syphilis.

The first symptoms are not very marked. The patient commences to lose interest in his business, becomes absent-minded, careless, inconsiderate, and, though he may be able to do regular routine work, does not seem to be able to take up any new work; the sexual instinct is not reasonably controlled. Tremendous projects fill the mind, and the patient becomes extremely egotistical and boastful of himself and his possessions. He gives away immense sums of money which he thinks he has.

A tremor of the lips and tongue and irregularity of the pupils is next noticed. The gait is peculiar. The patient may sink into a hypochondriac state. Sleeplessness is common. There may be epileptic seizures followed by paralysis. The bladder and rectum become paralyzed, urine and feces being passed involuntarily. The patient becomes bed-ridden, extremely liable to bed sores. Death occurs from exhaustion or some intercurrent disease.

If the disease is due to syphilis, and is recognized early, large doses of iodide of potassium should be administered in the hope of

arresting the disease. If this is not successful, the quiet, orderly life of a hospital for the insane is the best place for the patient. Bromides should be used for sleeplessness and for the epilepsy. Long remissions sometimes occur, but these are not due to the drugs.

APOPLEXY.

In apoplexy there is a sudden loss of feeling, consciousness, and voluntary motion. Its immediate cause is internal pressure upon the brain, from congestion or effusion. It is most usually produced by blood from a ruptured vessel of the brain. Some cases are caused by a blood-clot lodging in a blood-vessel that carries blood to a part of the brain; the part thus deprived of its blood-supply at once ceases its activity. This form occurs in heart disease generally. It generally attacks elderly or middle-aged persons.

When a person is attacked, he suddenly falls, losing for the time his sight, hearing, feeling, and power of motion, while the action of the heart and lungs still continues. The veins of the face and neck become turgid with blood; the pulse is full, strong, and slow; the breathing is also slow, and the power of swallowing much impaired, or entirely lost. The patient may entirely recover but very often partial paralysis will remain for a long time, and may become permanent. The mind is often more or less permanently injured.

Persons usually recover from the first attack, and may possibly from the second. Profound coma or stupor, small pulse, cold extremities, cold sweat on the skin, with increasing intervals between breathing, are fatal symptoms.

A predisposition to the disease is also acquired by certain habits of life. Anything that weakens the walls of the arteries, such as high living, disease (especially syphilis), over-exertion, sedentary pursuits, and long continued mental exertion, in short, **excesses of any kind**.

Treatment.—The first thing to do in a case of apoplexy is to equalize the circulation, thus withdrawing the pressure of blood from the brain.

Prompt and energetic means are necessary. Place the patient in an easy position, with the head elevated. Remove everything from the neck that might prevent the free return of blood from the head. Apply cold water freely to the head, face, and neck, and as soon as possible place hot bottles to the feet and legs. Strip the patient, rub the feet and legs, gradually rubbing up over the body and arms. This will produce a warmth to the extremities and a free flow of the blood to those parts and withdraw it from the brain.

Send at once for the doctor. The patient should be placed in bed, with the head and shoulders somewhat elevated, and hot bricks or stones placed about his legs and body. (Be sure not to have these too hot, as burns are readily produced.) As soon as he can swallow, a brisk purgative should be given.

MELANCHOLY AND HYPOCHONDRIA.

These diseases are so nearly alike that it is often difficult to draw the line between them. The treatment of them is substantially the same, to be varied only according to circumstances and degree of the affection.

Melancholy is the incipient stage, a mild degree of insanity or mental derangement, while it is also the highest degree of hypochondria. Each passes gradually into the other, and they are liable to terminate in complete alienation of the mind. Melancholy is purely a disease of the mind, and may or may not be connected with other complaints. The patient shuns society, and seeks to be alone; is low-spirited, fretful, suspicious, and inquisitive; has a distaste for everything, and everything goes wrong with him; and he is apt to dwell upon some single circumstance or misfortune, which is generally the cause or supposed cause of all his troubles. The disease is often due to some sudden misfortune as the cause, such as the death of a friend, or member of the family, disappointed affection, matrimonial difficulty, sudden financial losses, and the like. Some patients seem always to want more room, or more air, and are constantly wanting the windows opened, or prefer to be out of doors, seeming to dread confinement; others are constantly apprehensive of some calamity, or in fear of being taken up for some dreadful crime, or that they have committed some unpardonable sin. So tormenting are these fears sometimes that the unfortunate sufferer seeks to end his troubles by suicide. There may be palpitation of the heart, difficult breathing, pallid and haggard countenance, costiveness, diminished urine, deep sighing, and frequent weeping without any cause.

Hypochondria is always more or less a disease of the general nervous system, often closely connected with dyspepsia and derangement of the liver. Persons of a melancholic temperament are most liable to it, especially if of a sedentary habit of life. There is usually great depression of spirits, with absurd fancies and apprehensions. As in melancholy, the mind is greatly disturbed, the person is troubled with imaginary evils, suspicions, and fear of death. He also believes himself afflicted with some disease, or complication of diseases, and often

has most ridiculous fancies about it. He is also troubled more or less with sour stomach, belching of acid and corrosive matter, vomiting of tough phlegm, and coldness of the skin; a sort of spasmodic constriction of the throat; pains under the ribs of the left side; palpitation of the heart; wakefulness, and generally costiveness of the bowels; timidity, and gloomy forebodings. It would be impossible to enumerate all the symptoms, even of one unfortunate hypochondriac; while with different persons they vary to an almost endless extent. The leading characteristics are imaginary diseases, fear of impending evils, and a desire to be constantly taking medicine and treatment.

This condition may be brought on by long and hard study, grief, inactivity of the liver, intemperance, high living, indigestion, and whatever will derange the nervous system. The disease, though distressing to the patient and troublesome to the physician, is not often dangerous.

Treatment.—The cure in both these diseases depends much less upon medicines than on judicious management of the mind, which requires the utmost care and tact, as the patients are generally capricious and irritable in the extreme. The mind must be diverted from that train of gloomy subjects and apprehensions on which it has dwelt so long, and turned to other objects, new and interesting. The patient should have cheerful company as much as possible, agreeable amusements, interesting scenery, and, where practicable, should travel; take plenty of exercise, especially riding on horseback, and otherwise engage the mind with pleasing and interesting objects. In order to gain the confidence of the patient his imaginary complaints should be attended to as if real. His medicines should be changed from time to time, when he expresses disappointment in their effects. He should have medicine of some sort or other, though often, it may be, of an innocent character, as long as he wants it, and every wish of this kind, if not injurious, should be, as far as possible, gratified. In many cases tonics and stimulants are good; bathing daily should be insisted upon, the skin being well rubbed while drying. The diet should be carefully regulated according to circumstances, and the particular condition of the patient. In general, light animal food will be the best. If there are dyspeptic symptoms such vegetables and fruits as easily cause acidity, and flatulency in the stomach, should be avoided. Green tea and coffee should be avoided. A good black tea, not very strong, may be used; also chocolate and cocoa, and a little good claret or madeira wine, but not so as to acquire a habit for them. Opium and narcotics of

all kinds are to be avoided. If the patient has become habituated to their use, he must gradually be weaned from it, or no hope for a cure can be entertained. Sea bathing is good; the ordinary sponge or shower bath every morning should be a part of the treatment, and is of the greatest benefit in all nervous and hypochondriac cases.

In the commencement of the treatment it may often be well to clear the stomach with an emetic, especially where there appears to be an accumulation or tendency to viscid mucus or sour acrid matter. Purgatives are also necessary occasionally. Where there is sour stomach and dyspeptic symptoms, alkalies should be used in moderate doses taken after meals. A little bicarbonate of soda is good; also magnesia, and prepared chalk; about 10 grains of rhubarb, with about a tablespoonful of magnesia, taken once a day, is useful both as a laxative and to correct the acidity of the stomach. Some good tonic is to be taken two or three times a day; daily bathing, free exercise, alkalies to counteract the acidity of the stomach, with occasionally some changes and additional remedies of a harmless character to suit the whims of the patient, will be sufficient, generally, as the medical part of the treatment. The balance of the treatment, and often the main part, will consist in the proper and judicious management of the mind, engaging it upon varied objects of amusement, pleasure, and interest.

Advance in knowledge of mental diseases is slower than along other lines. A great step forward is the recognition of the fact that insanity is a disease which often can be cured. Insane people or people with a taint of insanity should not be allowed to marry. Transient insanity is often caused by pregnancy, and by acute fevers; but complete recovery usually results. Over-work, worry, severe mental strains, excesses of all kinds, particularly alcoholic and sexual, all tend to produce insanity, especially in people with inherited tendencies. Many cases of insanity are perfectly curable, if properly treated. As a rule proper treatment can be secured only in hospitals for the insane.

Insanity, Lunacy, Mental Alienation, Unsoundness of Mind.—

It has puzzled the most acute to give an accurate and at the same time sufficiently comprehensive definition of this condition, although all are aware of the general sense of the terms used to indicate the malady. It is sufficient here to mention that the most general division of the subject is into **mania**, that is, insanity, along with more or less violence in demeanor and action; **monomania**, in which either the understanding or the will is perverted on one particular point; and

dementia, or incoherent thought, verging on **imbecility**; **amentia**, or idiocy, has been adverted to elsewhere.

The main character of insanity, in a legal point of view, is said to be the existence of **delusion**, that is, that a person should believe something to exist which does not exist, and that he should act upon this belief. Many persons may labor under harmless delusions, and still be fitted for their social duties; but should these delusions be such as to lead them to injure themselves or others in person or property, then the case is considered to require legal interference—otherwise not.

The approaches of insanity are variously characterized; sometimes, **to all appearances**, it comes on without warning, a sudden outbreak of violent mania being the first intimation of the disease; even in these cases, however, investigation will generally discover that there has been some amount of preceding disorder, some sleeplessness, some unusual irritability, or mental excitement, perhaps concealed or controlled by the individual. In other cases, the mental oddities, irritabilities, fluctuations of spirits, etc., have been evident, but too slight to excite anxiety. At the last, the acute attack may be induced by some severe or prolonged mental emotion, or by some physical depression. The onset of the attack itself is frequently preceded by or accompanied with feverish symptoms, which particularly affect the head. In this case the insanity is, probably, at its first onset accompanied with acute affection of the brain or its membranes, and is **delirium**, properly so called. Where the circumstances, such as hereditary predisposition, or previous warning symptoms, give rise to the suspicion of impending insanity, medical advice must at once be sought, preparatory to the one essential and most merciful step—removal of the patient to an asylum. In the meanwhile, the most perfect quiet, both of body and mind, and the treatment of **delirium**, will be the most advisable mode of proceeding.

The definition of insanity, as has been said, is very difficult, and frequently gives rise to much legal controversy. Broadly, it may be viewed as a mental condition which unfits a person for the ordinary business and duties of life. The malady may arise from a congenital deficiency of intellect, as in idiocy and imbecility, or in a perverted condition of the intellect shown by certain delusions of the understanding; or the intellect may remain intact while the sentiments become depraved. To this latter condition, the term **moral** insanity is sometimes applied, and it comprises the well-known form of the disease called **melancholia**, as well as various aberrations of the moral facul-

ties in which the passions and emotions manifest themselves, sometimes in an exalted and at other times in an impulsive and uncontrollable manner. As often as not, both conditions are combined, and it is barely possible in most cases to draw a rigid line between them; still, for the purpose of classification and analysis, we may recognize the following classes of mental disorders: (1) mania; (2) melancholia; (3) dementia; (4) paralysis of the insane; (5) idiocy; (6) imbecility.

Mania may be either acute or chronic, and is characterized at first by emotional peculiarities, and afterwards by disordered intellect. The symptoms are ushered in by gloom and despondency, sleeplessness, impatience, and irritability, and often combined with these, the natural functions are disturbed; the skin is hot and dry, the bowels are confined, and there is much aversion to food. The patient, hitherto reasonable and methodical, becomes moody and morose; kindhearted and affectionate, he takes a deep-rooted antipathy to those he was wont to love, or some special form of the malady is manifested by an inordinate craving or exalted propensity. A desire on the part of the patient to take away his own life or the life of another, to which the terms "suicidal" and "homicidal" mania are applied, is not uncommon. Then there is "kleptomania," a desire to appropriate anything belonging to another, "pyromania," a disposition to commit the crime of arson, and "dipsomania," an unconquerable longing for intoxicating liquors. Puerperal mania is that form of insanity which sometimes takes place a few days after child-birth, and is attended at the outset with much fever and delirium. Epileptic mania results from continuous attacks of epilepsy, by which, at length, the mind becomes hopelessly impaired and the memory of past events is lost. The term "climacteric" is affixed to a form of mania which occasionally occurs with women when the menses cease to flow. When the acute stages of these various phases of mental disorders pass away, the victim is very liable to repeated relapses, and chronic mania, which by slow degrees enfeebles all the faculties of the mind, is the sequel.

The term **melancholia** is largely applied to certain cases of mental aberration in which grief and despondency predominate, where life becomes a burden to its possessor, who is too often prompted by a desire to get rid of it. Like mania, it has many phases, sometimes assuming a religious garb, in which most grotesque notions regarding religious doctrines are predominant, or the dread of everlasting punishment is ever before the patient. Sometimes it takes the character of an aggravated form of hypochondriasis, a disease akin to hysteria

in the female, and sometimes, especially with emigrants from rural and mountainous districts, it is expressed by a sad longing to return to the home of their birth.

Dementia signifies a more aggravated form of madness than mania or melancholia, although it is often the sequel of both. It is characterized by failure of thought and memory, and may range in its symptoms from a feeble mental condition, simply, to complete loss of intellect. In its advanced state persons suffering from the malady often become paralytic, their utterance is affected, and they become perfectly helpless both in body and mind.

What is termed "**general paralysis**" of the insane is perhaps the most serious malady of all. The commencement of the complaint is generally very gradual, and is marked by symptoms common to other forms of paralysis, but after a time these are combined with delusions of a very exalted character, in which a sense of the patient's own importance, powers and wealth is a distinguishing feature. He asserts his dignity as a prophet or king, and lays down laws for the million in the most incoherent and ridiculous manner. As the disease advances, the paralysis becomes worse, frequently affecting the act of swallowing, while the mind lapses into complete dementia. These are short convulsive attacks of a mixed epileptic and apoplectic character, after one of which death often ensues.

When a person is shown to be insane, there can be little doubt that a lunatic asylum is the place best suited for his reception, as the management of the insane cannot be satisfactorily carried out so long as they are surrounded by home influences. On the other hand, it is very important that the state should provide safeguards to protect sane persons from the risk of being isolated from interested motives on the part of others. The laws relating to the custody of lunatics are consequently very stringent, and there are formalities necessary to be taken before a person can be lodged in a lunatic asylum.

Insanity is a disease, which, when once developed, ought never to be kept under domestic management, or rather mismanagement; the only reasonable hope of cure rests with speedy removal to proper care, and to a state of external circumstances especially adapted to promote recovery. Asylums for the insane are not what they were, and the most attached and affectionate relative need not fear to place the afflicted under the protection of a well-managed establishment.

A very erroneous idea exists that if a person be insane he cannot act or look like a rational being at all, but must be constantly doing things in an insane manner. Consequently, if the individual be simply

lunatic or monomaniac, without being actually under the influence of maniacal excitement, or even should he have a "lucid interval," that is, a temporary cessation of mania, and temporary return, either wholly or partly, to his rational condition, those around are apt to be lulled into a false security, the vigilance or attendance is relaxed, and a momentary return of the delusion is attended, perhaps, with the most serious consequences, rendering useless hours and days of anxious care.

In addition to the various causes predisposing to, and directly exciting insanity, such as hereditary tendency, political or commercial excitement, grief and disappointment, false or erroneous religious excitement, etc., there is a vast amount of insanity caused by drunkenness. The temporary insanity of intoxication cannot be indulged in with impunity; it may be frequently repeated, but at length the mind permanently gives way, and the individual becomes a confirmed lunatic. On this point, an experienced writer remarks: "Intemperance and insanity, the two greatest curses of civilization, are in their very nature so intimately connected, that any examination of the one would be necessarily incomplete without the other; for both exhibit, as their essential phenomena, perversion or disorder of those mental powers which impart to man his vast superiority over the rest of the creation. Since, then, a single dose of intoxicating substance possesses the power of temporarily disordering the intellect, perverting the moral sentiments, and even wholly suppressing the operations of the mind, it is not wonderful that the continued use of such agents should frequently induce permanent mental derangement."

Shingles, known to medical men as **Herpes**, consists of groups of vesicles situated upon inflamed patches of skin. The "breaking out" upon the lips, nose, etc., which occurs after a cold, is an eruption similar in kind to that of shingles. Shingles is usually situated near the waist, surrounding one-half of the trunk of the body, like a zone or belt; it may, however, extend in other directions over the trunk, and, but rarely, on the limbs; it is always situated on one side, and that, generally, the right. The eruption of shingles is generally preceded by symptoms of general indisposition, and especially by severe darting pain in the parts where it is about to appear. At first, red patches show themselves, and gradually become more numerous till they form a line; upon these patches shining points form, which gradually enlarge into vesicles, a little under the size of small peas. These vesicles contain a clear fluid, which gradually becomes opaque. At length, in the course of eight or ten days, the vesicles burst, discharge, and dry off in the form of scabs, or it may be, in very weak subjects, leave sores or ulcerations. In itself, shingles is a disease devoid of danger, but requires investigation, on account of its frequently being a sign of constitutional disorder and disease. On this account, although the eruption itself may subside under the use of simple remedies, a case of shingles should be examined by a medical man.

When the disease occurs in the young and plethoric, the diet must be reduced to one of milk and farinaceous substances, and all sources of heat or excitement avoided. Five grains of blue pill at night, followed by senna, black draught, or Seidlitz powder in the morning, may be repeated once or twice; and, in the course of the disease, if there is much fever, five grains each of the carbonate and nitrate of potash may be taken twice or three times a day, dissolved in half a tumblerful of water; or the proportion of carbonate of potash may be doubled, and a teaspoonful of lemon juice added to form an effervescing draught. The painful itching of shingles often causes much distress. It may sometimes be allayed by simply keeping the eruption covered with starch or white oxide of zinc powder. The severe pain often complained of between the ribs is relieved by opiate applications, such as tincture of opium, extract of belladonna, and tincture of aconite, either singly or in combination. In mild cases, cotton wool supported by a bandage round the chest is perhaps the best application.

When shingles occur in the aged and debilitated, instead of the diet being reduced, it should be improved; the system must be sustained with nourishing broths, and probably with wine, along with quinine and medicinal tonics, the bowels being regulated, but not purged. In such cases, a medical man must be in attendance. Care should always be taken that the vesicles of shingles are not forcibly burst, as by lying upon them; if they are troublesome, ulceration may follow. Herpes is not contagious; it is generally owing to constitutional disorder, which only a medical man can discover and rectify.

Blindness.—Loss of sight may be the effect of a great variety of causes. Disorder of the brain itself, or sympathy of that organ with the stomach, may be the occasion of the symptom; the optic nerve or its expansion within the eye, named the retina, may be the affected parts; or, lastly, some of the transparent structures of the organ of vision may, by becoming opaque, obstruct, wholly or partially, both light and vision.

Loss of sight may come on suddenly, or very gradually; in the former case, it is generally consequent upon some disorder, actual or sympathetic, of the brain or nervous tissues, and is always to be regarded seriously. It may last only for a few seconds, or it may be permanent. In diseases such as apoplexy, loss of sight is a very constant symptom; at least, the eye is insensible to the usual impressions; in these cases it is dependent upon pressure on the brain. In diseases attended with exhaustion, or after copious loss of blood, the same symptom occurs.

A transient loss of sight, unrepeatd, and occurring unaccompanied by symptoms indicative of head affection, will sometimes be occasioned by simple disorder of the stomach, which abstinence and one or two doses of the blue and compound colocynth, or rhubarb pills, will rectify; but in the event of the symptom recurring, with headache, giddiness or nausea, a doctor should be called at once.

Sea-Sickness.—The primary cause of the distressing affection, sea-sickness, has been a good deal disputed, but its dependence upon a peculiar condition of the brain and other nervous centers, brought about by the motion of the vessel, seems now very generally admitted. It has been imagined that the effect upon the brain was conveyed through the medium of the eye, and caused by the apparent movement of the objects of sight; as, however, blind people suffer from sea-sickness, the affection must be excitable by other means than the above. Possibly, as has been suggested, it partly results from disturbance of certain portions of the brain which have for their function the preservation of the equilibrium of the body. That, however, sight is in some degree accessory to the excitement of nausea is evident from the fact that some persons experience the sensation simply from objects appearing to move before them, as they do from a ship moved by the waves, or indeed, in some cases by the mere appearance of a waving pattern upon a wall paper. The affection is more readily caused by long, heaving waves than by a short, rough sea. The best preventives of sea-sickness seem to be the horizontal posture, as near the center of the vessel as possible; that is, where the motion is least. Exposure to the open air renders the liability less. Stimulants, combined with sedatives, certainly appear to have considerable effect in preventing or alleviating the affection. A pill, composed of four grains of cayenne pepper, with two or three of extract henbane, taken at intervals, may be found useful. A sure cure is $1/120$ grain of atropine, $1/60$ grain of strychnine, given as a hypodermic injection and repeated once or twice at intervals of an hour, if necessary. The bromide of sodium or of ammonium is also useful, fifteen grains to be taken in plenty of water and repeated at intervals of three or four hours. A good remedy is two teaspoonfuls of the following in half a cupful of water, to be taken an hour before going aboard and repeated two or three times at intervals of two hours: Two drams of bromide of potash, four drams of tragacanth mucilage, one dram of Indian honey tincture (*cannabis indica*), one-half dram of arsenic solution (Fowler's solution); water to make three ounces. This is enough for twelve doses, and two teaspoonfuls is a dose. Some persons find themselves less liable to sea-sickness if they take food freely, with others the reverse is the case; the effect probably depends upon the state of the digestive powers of the stomach, temporary or permanent. If these are vigorous, the excitement of digesting food acts probably as a counteragent to the cause of the nausea. Sea-sickness of itself is rarely injurious, but it should be a subject of consideration with persons who are liable, or likely to be, to head-affection, who are the subjects of rupture, prolapsus, etc., how far they should incur the risk of these being aggravated by the mechanical action of vomiting. Some who do not suffer from sickness while on the water, experience nausea and other uncomfortable sensations after landing, an effect, doubtless, due to a partial disturbance of the digestive organs, and probably to biliary disorder. One or two doses of compound colocynth, or compound rhubarb pill, will generally remove the inconvenience.

Rigor is the sudden sensation of cold, with shaking, or, in other words, the "chill" or "shivering" which precedes the inflammatory stage of many acute diseases. When severe it indicates suppuration in some part of the body. It is probably a nervous affection, for it occurs in many states of the body in which there is neither fever nor inflammation. It is a common symptom of bile in the stomach; it occurs also on the passage of gall-stone or of renal calculus; it often

occurs at the commencement of labor, and may even be caused in a slight degree by certain sounds.

Spasm is painful contraction of the involuntary muscular fibers, in contradistinction to **cramp**. There is cramp in the legs, spasm in the stomach or bowels, in the latter case constituting **colic**. Spasm of the stomach, owing to the presence of indigestible substances, is not infrequent. It is characterized by sudden agonizing pain in the region of the stomach, which, like other spasmodic pains, is relieved by pressure; there may be attempts at vomiting, and perhaps eructation of wind. The severity of the pain, in this form of spasm, makes speedy relief important, and for this the general remedies given under **Colic** should be resorted to; in addition, if the presence of irritating matters in the stomach is suspected, an emetic should be given at once; and after it has acted, or in place of it, if it is not given, an antacid (magnesia, or soda, or potash), in combination with a stimulant (sal volatile or brandy), and also opium. Five grains of rhubarb, five of carbonate of soda, a teaspoonful of sal volatile, and from ten to fifteen or twenty drops of laudanum, will form a dose, which may be repeated after half an hour, or at a longer or shorter interval, if requisite. These measures may be followed out, and give great relief, before a medical man can be procured, which he ought to be if the attack does not yield at once, for it is possible that other disorders may be mixed up with it. After the immediate attack has passed away, the digestive functions will require attention.—See **Indigestion**.

In all cases of spasm, it should be remembered that the application of heat by the hot bath or by hot fomentation is one of the best, and certainly is the safest, remedy.

Cramp is a spasmodic, involuntary and painful contraction of the muscles. The term is generally applied to the affection of the voluntary muscles, in contradistinction to **spasm**, applied to that of the involuntary. Any muscles may become affected with cramp, but those of the legs and arms, the former especially, are most liable to be, doubtless from the greater liability of the nerves supplying the lower extremities to irritation and pressure, two great exciting causes of the disorder. The cramp may be confined to one or two muscles, such as those of the calves of the legs, or may be more general, as happens in cholera. The affected fibers are drawn in hard, knotty contractions, and maintain this condition for a longer or shorter time. The most frequent causes of cramp are the presence of indigestible food in the stomach, or of acid in the bowels, or the pressure exerted on the nerves by overloaded bowels. A similar acting cause in pregnancy and labor, the weight and pressure of the child, also occasions painful and troublesome cramp. The disorder is often associated with the presence of worms. When cramp affects the arms and fingers, it may be connected with disease of the heart and great blood vessels of the chest. The power of the application of sudden and prolonged cold in producing cramp is often sadly exemplified in the case of bathers. The best immediate remedy for cramp is friction with the hand, or, better still, with the soap, chloroform or opium liniment. When the legs are affected, it is always expedient to take medicine, rhubarb and magnesia, with a teaspoonful of sal volatile, or a little ginger; and afterwards to clear out the bowels with some active aperient, such as castor oil, especially if there is any existing constipation, or a possibility of their being loaded. Any other disorder of the digestive organs ought, of course, to be attended to.

Skin Diseases and Disorders

Eczema, Ring-Worm, Jaundice, Scald
Head, Hives, Freckles, Corns, Chil-
blains, Itch, Baldness.

Subject Reference

*For the Care of
the Skin, see
"Health and
Beauty," Vol. 1,
pages 77-107.*

General Description.

Diseases of the Skin.—The diseases and disorders to which the skin is liable, are numerous. It is exposed, not only to many influences from without, to the effects of neglect and dirt, to contagion and accident, but it is also liable to influences from within, arising from those internal organs with which it is so intimately connected, both sympathetically and in function, and it is excited by altered conditions of the blood, for which it performs such important offices.

The **exanthemata** (or eruptive fevers), measles, scarlet fever, smallpox, and chicken-pox are each marked by a specific eruption, and are described elsewhere. Some authors, however, include in the class of eruptive fevers, erysipelas and erythema, nettle-rash and rose-rash, and even typhus and typhoid fevers.

Skin diseases are very numerous and often perplexing, on account of their intractable nature, and tendency to partake of more than one type. They are best known from the character of the eruption, which may range from a slight blush or patch of redness to endless forms of alteration of the integument. The more important skin diseases may be all grouped under the following classes: 1. Erythema and erysipelas belong to **simple inflammation** of the skin. 2. **Papular** skin diseases are distinguished by minute and pointed elevations from the surface, terminating in scurf, of which prurigo, lichen, and prickly heat are examples. The latter are extremely troublesome, from the intense itching with which they are accompanied, and the obstinacy with which at times they resist treatment. Tepid baths, with or without the addition of vinegar; or sponging with water, to each pint of which a drachm of diluted sulphuric acid has been added, may be tried as a temporary relief to the itching. 3. The **vesicular** class of skin diseases are also characterized by elevated points containing lymph or serum, clear and colorless at first, but afterwards opaque. They include

chicken-pox, which may be classed with eruptive fevers; also shingles. One of the vesicular eruptive diseases, eczema or crusta lactea, has its frequent site upon the scalp and face. 4. The class of "pustular" eruptions also comprises various scalp diseases. In many of the affections of this class, however, the pustular eruptions extend over various portions of the body.

5. The class of "bullæ" are characterized by the development of "blebs," or small blisters, which resemble those occasioned by a scald, or by the use of a common blister, and when broken, leave the skin red and inflamed. This form of skin disease is generally associated with great debility of constitution.

6. The "scaly" diseases of the skin are many of them extremely obstinate, and sometimes resist every form of treatment. Of these, lepra and psoriasis are characterized by elevated, scaly, circular patches, distributed in greater or less number over the skin. Lepra is a disease totally distinct from the leprosy of the Jews and other ancient nations. Tubercular diseases of the skin are equally difficult to get rid of, and often suppurate and ulcerate. Stains, mother-marks, or "nævi," freckles, etc., are all included in the category of skin affections.

Skin diseases are derived from various sources, some from the animal, some from the vegetable kingdom; some occur associated with contagious and epidemic disease, others are peculiar to well-known diseases, which are neither epidemic nor infectious; while the majority depend on the constitutional peculiarities of the individual.

No description could possibly enable an unprofessional person to distinguish one chronic skin disease from another. These affections are, in a majority of instances, indicative of some peculiar disordered condition of the blood, or of the digestive processes which requires the strictest investigation of a medical man, and probably, a long-continued course of treatment, whilst even under the best directed remedial measures they often prove intractable. Very many chronic skin diseases are connected with debility, and of course, when such is the case, tonic remedies are useful; a smaller proportion are owing to a plethoric state of the constitution; some appear hereditary, and others are connected with the venereal taint. Whatever the case be, however, those who suffer may be assured that their best course will be at once to put themselves under proper medical advice, and, if they can, under the advice of a practitioner who has made the skin a department of special study. Above all things, let sufferers beware of quack ointments, lotions, and the like; they may inflict upon them-

selves irreparable injury. In the event of any delay occurring before advice is procured, if the system is full, and inclined to fever, low diet is advisable, and one or two small doses of calomel, followed by a saline aperient, may be taken with advantage. If the system be debilitated, whilst all sources of heat and irritation are avoided, nourishing diet should be taken, and the bowels regulated. When milk diet agrees, it is very suitable in many chronic skin affections, and there are few in which tepid bathing does harm; it clears the skin of any irritating matter, whilst it soothes; it is, at all events, generally agreeable to the feelings of the patient. Another reason for the enforcement of tepid bathing is the fact that, although, as stated above, very many, perhaps the majority, of skin diseases, are connected with constitutional disorders, some are almost entirely due, and others much aggravated by, inattention to cleanliness, among certain classes.

Eczema, Salt Rheum.—The symptoms are redness, cracks, itching, moisture, crusts and thickening of the skin, but these are not all present at once. It occurs in various constitutional affections, and it is extremely apt to supervene on measles. Among the aged, the circulation becoming languid, eczema is prone to be very troublesome; it usually attacks the legs in these cases, particularly the calves and shins, and resists cure, though it may be alleviated. The skin of those parts which have suffered from repeated attacks of the disease undergoes sensible changes; it becomes permanently red and thickened, and when pinched up by the fingers, it changes its color at the point of pressure to a dirty yellow hue. Eczema, as a rule, is not difficult to cure, but in adults it is liable to recur, and in the aged it is very intractable.

Eczema is of more common occurrence than any other affection of the skin. It is not a contagious disease. Though considered vesicular (that is to say, attended by an eruption and exudation of watery fluid from the skin, which dries up into a scab or crust), it presents various appearances, being sometimes marked by pustules, sometimes by papules; while at other times, and not unfrequently, the inflamed skin has a smooth, glazed look, without a trace of eruption. All parts of the body are liable to eczema, but its more frequent sites are the scalp and hairy parts of the face, where it is most liable to take on the pustular form; the hands, feet and legs, as well as those parts of the skin liable to contact and friction with other parts, as the flexions of the joints, the nates, and the inside of the thighs, are also prone to be attacked. The disease is usually attended with much irritation and intolerable itching, and if scratching is indulged in by the patient, the symptoms are aggravated, and bleeding from the surface of the inflamed skin is most likely to ensue. Eczema is very common in infants and young children, and may be traced to want of cleanli-

ness, or to vermin in the hair, or to not drying the tender parts about the anus and groins after washing. In unhealthy children, it is an accompaniment of scrofula. In the treatment avoid letting the affected part of the skin get wet—avoid washing it. The bowels must be kept active and the general health improved.

The remedies employed for eczema are very numerous, and include those of a constitutional character, as well as local applications. In the case of infants and young children, carefully drying the parts after washing, and dusting them with the powder of zinc oxide and starch, morning and evening, combined with attention to the state of the bowels, will generally effect a cure. If the disease is the result of itch or vermin in the hair, it will be necessary to employ sulphur ointment, or ointment composed of ammoniated mercury (white precipitate), which should be smeared over the parts night and morning. If, on the other hand, the disease is a result of scrofula or other constitutional taint, it will be necessary to have recourse to steel wine, cod-liver oil, and to the class of remedies best suited for each individual case. When there is reason to suppose that the complaint is associated, as it very often is in adults, with derangement of the digestive organs, alterative and aperient medicines are indicated, such as rhubarb and carbonate of soda, combined with three grains of gray powder, three times a day. Should the person be florid and robust, an occasional smart purge with calomel and scammony, or the mixture of magnesia and Epsom salts, will be found effective. The diet ought to be carefully attended to, and abstinence from alcoholic beverages of all kinds strictly enjoined. In obstinate cases of eczema, no remedy has been found so serviceable as arsenic, but it is a powerful poison, and can only be administered under medical supervision. The arsenical solution (Fowler's) is given in five-minim doses in water twice a day, and must be persevered with till the symptoms abate, or the constitution is affected by the drug.

With regard to external applications, those which soothe inflammation and itching are most useful. A bran or bread poultice applied over the affected part will often do this, or the lime water liniment, so serviceable in burns and scalds, will be found equally useful in allaying the irritation in eczema. In case of much irritation and itching, soothing ointments should be used. Lassar's paste is very useful here. It is made of zinc oxide, one part; powdered starch, one part; vaseline, two parts; to these may be added one part of salicylic acid to twenty-four parts of the paste, if there is no itching. The iodide of mercury ointment, glycerine, tannin, a weak solution of nitrate of silver, are each employed with the view of producing a normal condition of the skin; another good local application is the liquid pitch ointment, composed of five parts of tar to two parts of wax, which has long had a deserved reputation in the treatment of this affection. Persons liable to attacks of eczema will find the continuous employment of the coal-tar soap for the ordinary purposes of ablution an excellent preventive; but while cleanliness is essential, it is a mistake to overdo it by incessant washing of the parts most liable to the disease with soap and water. In the obstinate eczema of the legs in old people, the solid rubber bandage has proved especially useful. In general eczema, an ointment, composed of ten grains of boracic acid to the ounce of vaseline, is a most generally efficacious application.

Ring-Worm.—The real cause of this very troublesome affection of the skin is due to the presence of a fungus which is developed between the scarf and the

true skin which form a sheath round each separate hair. Inflammation of the hair follicles and their surroundings results, with the formation of pus, which has the double effect of checking the growth of the hair, and causing baldness. The spores (seeds) of the growth are to be seen in the form of white powder at the roots of the hair. The most usual site of the disease is the scalp, but it is apt to extend to the forehead, to the beard, and also to other parts of the body. Generally, the first indications of the presence of ringworm are the falling or breaking off of the hair, which leaves a **bald patch** (generally circular), and the **itching** which accompanies the disorder. At this time, the patch is scurfy, slightly red, with the irregularly broken hairs protruding. If the disease be unchecked by treatment, it goes on extending until at last it involves almost the entire scalp. The hair which is not detached, on the affected parts, becomes lighter in color and woolly in character. If pustules form, the discharge from them dries upon the surface in the form of scurfy scabs, or in crusts. The disease is **highly contagious**; by the comb, brush or finger-nails (owing to the itching), it is extended to different portions of the same head. It is very liable to spread in schools and among members of the same family.

Few diseases have given more trouble or vexation in their management than ringworm. The main object is, of course, to destroy the fungus, for if this can be successfully accomplished, the disease is cured. It is necessary to **remove the hair**, if it should not have already been destroyed by the disease itself, and then to apply some chemical agent capable of destroying the fungus embedded in the hair follicles and surrounding tissues. The **oil of cade**, or pitch, is probably the best means of destroying the parasite; it should be combined with **glycerine** in the proportion of a drachm of the oil with an ounce of glycerine. Lotions composed of **sulphurous acid** and water, one part to three, or of **hyposulphite of soda**, one ounce to twelve ounces of water, are very efficacious. **Chrysophanic acid** (the active principle of goa powder) is used in the form of ointment prepared with from ten to sixty grains of the acid to an ounce of lard or vaseline. It is necessary to remove each hair of the area affected separately, by means of tweezers or forceps.

Jaundice is a secondary disease, the result of a primary one. That is, some cause, in the first place, stops the flow of bile from the liver; and jaundice, which is due to the absorption of the bile into the blood, is the effect.

This impediment to the flow of the bile may arise from whatever blocks up the canal of the gall-duct. Probably, gall-stones, or thickened bile, are the most common obstructions; but tumors which press upon the duct, or spasm, may also produce a similar effect and induce jaundice. Jaundice has sometimes succeeded violent mental emotions. It is also due to congestion of the liver, which impedes the outflow of the bile. The presence of bile in the blood is quickly manifested by the color of the skin, and also more particularly of the white of the eye; the change of color varying from the slightest perceptible tinge to deep golden yellow, or even brown. At the same time, the stools become white and chalky-looking, and the urine—sometimes the perspiration—is deeply tinged with bile, the patient often describing it as like porter; the constitutional symptoms are generally those of disordered digestion, headache and languor. For many reasons, jaundice is a disease which ought, when possible, to be under proper medical treatment, not so much from the danger of the affection itself, as from its being a sign of disorder elsewhere. Should gall-stone or spasm be the cause of jaundice,

the case is generally plain, but should the presence of a tumor, or disease of the liver, be the origin, it requires medical examination.

The treatment of jaundice, which unprofessional persons may adopt, in the absence of a medical man, is very simple: from five to eight grains of "gray powder" may be given at bedtime, either alone or, if there is pain, made into pill with extract of henbane, and followed by a dose of castor oil or senna in the morning. When there is much acidity of the stomach, a half a teaspoonful of carbonate of soda (common baking soda) may be given. A mild attack of jaundice will generally yield to an aperient like the compound rhubarb pill, taken every night for a few nights in succession. We also now possess most valuable aids in the treatment.

Acne.—This is a disease of the skin, taking the form of what is generally called a pimple. It is due to an accumulation of secretion in the glands which produce the oily matter. In its simplest form, small white points are seen in the skin, or if, as is commonly the case, a little dirt collects in the orifice of the gland,—as black points, called "black heads." On squeezing these the accumulated secretion is removed as a little maggot-like body. Usually the skin becomes red and painful round these collections, and matter forms and is discharged. In others, the part becomes hard and swollen, but still red and irritable. Acne occurs chiefly upon the face and over the shoulders, also on the chest. It rarely occurs in children; it is most common about puberty, and from that time onward to two or three-and-twenty. It is frequently met with for the first time at the age of forty or later.

It sometimes makes its appearance as large red pimples, upon the nose of those who have indulged too freely in the pleasures of the table. This form is called **Acne rosacea**—in common parlance "grog blossom." To prevent the disease, frequent and thorough washing with soap and warm water, followed by friction with a rough, soft towel is a good plan. All black spots should be removed, either by squeezing between the nails or by pressing down upon them a ring a little larger than the black spot, such as a watch-key. The digestive organs must be regulated, and exercise in the open air taken. The former is especially necessary in **Acne rosacea**. As a local application, the iodide of sulphur ointment will be found the most useful, or a lotion containing two teaspoonfuls of milk of sulphur rubbed up in a pint of water. Irritation is allayed by Goulard water. An infusion of an ounce of horse-radish, in twenty ounces of hot, not boiling, water is said to prevent or cure acne, the dose being a small wineglassful, night and morning. A small teaspoonful of carbonate of magnesia taken in water at bedtime will often relieve, and as an external lotion the following may be recommended: An emulsion made with a dozen bitter almonds, one ounce of glycerine, seven ounces of water and one drachm of alcoholic solution of coal-tar.

Scald Head, technically called "favus," or "porrigo favosa," is a disease of vegetable origin, mainly affecting the hairy scalp, though sometimes spreading to the face and neck, and occasionally attacking other parts. The parasitic fungus which occasions the disease has its seat in the hair follicle outside the layer of scarf skin investing the root of the hair. There is another form of the eruption in which the plant is in cells or depressions on the surface of the skin, giving it a honeycomb appearance, and from which it takes the name of "favus." These plant cells form crusts and appear in crops or patches in different parts of

the scalp, sometimes running together, but occasionally remaining separate and distinct. At an advanced stage of the disease, and when it has not undergone any medical treatment, the encrustation spreads over the entire scalp, presenting somewhat the appearance of a mask or vizor. The smell of the yellow encrustation is most peculiar, resembling that of the urine of a cat, or of a cage in which mice have been kept. The disease begins by itching, which is soon followed by a slight eruption of red-pointed elevations, which increase in size and, before twelve hours have elapsed, a yellow point forms on each of the apices. The surface appears now as if covered with specks of a sulphur-yellow color, and each elevation appears as if set in the skin with a depressed center, and any fluid exudation hardens into a dry, brittle, honeycombed scab. While increasing in size, the crusts preserve their circular form, the hairs become dry and brittle, and having no hold on the scalp are easily detached.

As in ringworm, the great point in the treatment of scald head is the destruction of the fungus, which is best accomplished by removing the hair, applying poultices and fomentations to the scalp, and using the tar ointment to the affected parts morning and evening, taking care to wash the scalp thoroughly with soft soap and water prior to each application. As it is barely possible to shave the head in the majority of cases, the hair must be cut as short as possible, and if the disease does not yield to the treatment recommended, it may be necessary to remove each hair separately by the forceps, and to follow the treatment prescribed for ringworm.

Nettle-Rash, Urticaria; Hives.—This is an eruption which closely resembles nettle stings, both in appearance and in the sensations it gives rise to. When acute, it is generally accompanied with more or less fever. In almost all cases, it arises from disorder of the digestive organs, caused either by indigestible food, or in some persons by particular kinds of food. Kernels or seeds, such as almond, peach, etc., which contain prussic acid, seem especially apt to cause nettle-rash, and in some individuals even the pips of an apple have been known to produce the disorder. Fish, particularly shell-fish, also bring it on, or mushrooms; also certain medicines, such as turpentine; teething, hurry and agitation of mind in adults, and other irritations, also give rise to nettle-rash. The removal from the alimentary canal of offending matters is the necessary treatment. If there is tendency to sickness, and if the eruption appears soon after a meal, an **emetic** is the appropriate remedy, but whether this is given or not, there should be given an **aperient**. As acid in the bowels often accompanies the condition, a dose of **magnesia with rhubarb** is very suitable, or some other antacid may be had recourse to, and, afterwards, **castor oil**. External remedies are not curative but give relief. A lotion of carbonate of ammonia and sugar of lead, a dram of each, in rainwater or of rosewater, will relieve. Flour or talcum powder should also be dusted on. If the eruption comes out repeatedly, and the above remedies do not stop its recurrence, see a doctor. Regulate the diet, giving only digestible, light food. An ointment made of one part of boracic acid in fifty of vaseline often gives quick relief.

Freckles.—The well-known brown spots on the skin are most frequent upon those parts exposed to the influence of light, such as the face, neck, hands, etc., and in persons of fair complexion, especially with red hair. Water, weakly acidified with lemon juice, is sometimes

useful as a wash; or a weak solution of corrosive sublimate (1 part in 1000 of water; this is very poisonous if taken internally). Sir Erasmus Wilson recommends carron oil, with the addition of a little ammonia; but freckles are not to be regarded as a disfigurement to the countenance or as incompatible with health, and attempts to remove them by cosmetics are liable in the long run to prove hurtful to the skin.

Corn.—A corn is a thickened state of the epidermis (outer or scarf skin), caused by irritation, such as pressure or friction, which causes an increased growth of the flattened cells of which the epidermis is composed. The corn, produced in the first place by external pressure or friction, soon becomes, in itself, an additional source of irritation, and, by its hardness, increases the inflamed and sensitive condition of the true skin underneath. If the causes are removed, the disease gets well, as anyone who has suffered from corns can testify, after having been confined to bed by illness for any time. Tight shoes are undoubtedly the most general originators of corns, but badly-made, loose or ill-fitting ones, also give rise to the affection, not by pressure, but by friction. Soft corns generally form between the toes, and are very troublesome and painful; they are kept soft by the continued perspiration of the part.

The most efficient cure for corns is, of course, to get quit of the cause,—the offending boot or shoe; but as some persons are so liable to the affection, or have their feet so formed, that if they wear boots or shoes at all they must suffer from corns, the best palliative is keeping the hardened mass well pared down in the center. Strong acetic acid, applied to a corn every evening, will sometimes effect a cure, a little olive oil being smeared over every morning. Various corn-plasters are used; the most effective and rational are those which are made thick, and have a hole cut in the center for the corn, which is thus preserved from pressure. Soft corns should be cut with scissors and the roots touched with strong acetic acid, and cotton wool placed over them afterwards to protect the adjoining toe from the effects of the acid, and the strictest cleanliness observed. A peculiar kind of corn occasionally forms under the corner of the nail of the great toe, and causes much pain and irritation; by slightly elevating the nail, the thickened mass may be turned out.

Chilblains.—Fold a piece of gauze or lint in eight thicknesses, moisten with 70 per cent alcohol, apply to the chilblains, cover air-tight with oil silk or rubber gauze and hold in place with a bandage. This is a safe and pleasant cure.

Superficial skin wounds, swollen glands, boils, inflamed joints or bones, may be efficiently treated with a dressing of clean cotton or linen, in several layers, saturated with 45 or 50 per cent alcohol and covered air-tight.

Itch, or Scabies.—This dreaded skin affection consists of an eruption of small, pointed vesicles, which appear chiefly upon the wrists and between the fingers, but also at the bends of both the upper and lower extremities, the inner parts of the thighs and also upon the breech in children. There is excessive itching, especially when the person affected gets warmer than usual, either in bed or after taking stimulating food or exercise. The itch attacks persons of all ages, of either sex, and is produced by an insect, the *Acarus scabiei*, which burrows under the cuticle, where it deposits its eggs. Unless caught accidentally by contact with

a person who has it, the disease appears to be mainly the consequence of dirt and uncleanness. It is frequent among the poor.

Fortunately, the cure is in almost all cases certain and quick; sulphur being the agent generally employed, in the form of ointment, made by rubbing up one part of the common "flowers of sulphur" with four parts of lard. Before the application is used, the entire skin should be thoroughly washed with soap and water; the ointment must then be well rubbed in all over the body, and washed off again next morning; the person sleeping in a flannel dress or between blankets, which, in workhouses and hospitals, are specially kept for itch cases. This process may be repeated two or three times if requisite. The clothes must be changed and disinfected. In persons of full habit of body, it is advisable for them to take an active purgative, prior to using the sulphur ointment.

In a disease so contagious as itch, the utmost care is requisite in the avoidance, not only of contact with the person suffering, but with any article of dress, or otherwise, which he may have made use of; and when the person who has suffered is cured, it is requisite for him to exert equal care with respect to these things himself, until they have been purified and disinfected. This may be done either by boiling water, by dry heat raised to a temperature of 200° F., or by fumigation with sulphur—bearing in mind the effect of the latter agent in changing or discharging the color of articles of furniture or dress. If much irritation of the skin exists, it is admissible to employ a smaller amount of sulphur than that indicated above, and to combine it with sub-carbonate of potash, in the proportion of one drachm of sulphur to half a drachm of the latter, mixed with six ounces of lard. To avoid the dirty inconvenience of a greasy application, recourse is now often had to a lotion composed of sulphurated potash and water, or to a hot bath containing the same. The strength of the lotion should be two drachms of the sulphurate to a pint of water, and four ounces of the sulphurate will be found sufficient for a bath, with thirty gallons of water. The same precautions as to washing the body night and morning, with brown or soft soap and water, require to be observed with this treatment. When sulphur is used for the cure of itch, it may occasion some amount of irritation of the skin, which, being mistaken for the uncured disease, sometimes causes persons to go on rubbing long after the itch is cured, thereby keeping up unnecessary irritation and causing needless trouble and uneasiness. The itch mite, or *acarus*, as well as its ova, are commonly destroyed after the first or second application of the sulphur, but the eruption caused by its ravages may take a week to heal.

Baldness, or loss of hair, is sometimes seen in infants; it frequently occurs in adults of the male sex, even in the prime of life, and almost universally, in a greater or less degree, in old age. The direct occasion of baldness is defect in the hair follicles, from which the hairs are developed, and this defect may arise from diseases affecting the skin itself, from acute general disease, as fever, or chronic constitutional disease, such as consumption; it may also arise from constitutional peculiarity, or the diminished circulation of blood, such as occurs in advanced life. Some families are peculiarly liable to baldness even early in life; those who perspire much about the head are often bald. Generally, however, whatever occasions dimin-

ished supply of blood to the scalp or skin, gives the hair a tendency to shed, and the treatment must be directed to stimulating the skin as much as possible. After acute disease, if the hair falls off, shaving the part two or three times in succession will probably strengthen the growth. In other cases, much covering upon the head, which causes perspiration, and consequently weakens the skin, must be avoided; the head should be well washed with cold water frequently (twice a week), and afterwards rubbed and brushed, to promote reaction. Various applications are recommended to prevent or cure baldness; they are all stimulant. Those of which cantharides, or Spanish blistering flies, form an ingredient, are generally most serviceable. A drachm of the tincture of cantharides, rubbed up with an ounce of lard, will form a sufficiently stimulating ointment. Falling of the hair, which is occasioned by eruptive disease, or which is accompanied with inflammation of the skin, of course requires a different and more soothing treatment; probably medicine is required, and the case is better submitted to the treatment of a medical practitioner.

In the baldness of early life, the hair drops off without the previous change of color which occurs in age; in the latter case, of course, no treatment is either likely to be resorted to or to be of service.

The following has been found an excellent hair-wash:—

Take of

Tincture of Cantharides.....	1 5
Spirit of Rosemary.....	1 5
Elder Flower Water.....	1 pint
	Mix.

This wash may be freely applied, night and morning, to the roots of the hair by means of a piece of lint or sponge.

Or, take of

Eau de Cologne.....	2 5
Tincture of Cantharides.....	2 5
Oil of Lavender and Rosemary, of each.....	10 drops

This may be applied once or twice a day, but if the scalp becomes sore it must be discontinued for a time.

INSTRUCTION FIFTY—*Circulatory System*

Heart Disease

Hardening of the Arteries.

Angina Pectoris or Spasm of the Heart, Anemia,
Chlorosis (Watery or Thin Blood).

Subject Reference.

*See Vol. 1, pages
25 to 44, for Or-
gans of Circulation
and Respiration.*

The Heart.

Heart Disease.—There are several forms of heart disease. The most frequent is that in which one or more of the valves are diseased, being distorted or shrunken so that part of the blood is allowed to flow back instead of going on as it does when the valves are “competent” or healthy. The result is that the heart is like a leaky pump—it either fails to keep up a good circulation of the blood, or, to do this, it has to do extra work. This extra work causes the heart to enlarge both in the size of its chambers and in the amount of its muscles. It is said to be “hypertrophied” (overgrown), and if this increased power makes up for the defect in the valve, then “compensation” is said to be established. If, owing to ill-health or over-exertion or exhaustion, the heart tires out and can no longer make good for the defective valve, compensation is said to be broken down. Every healthy heart has a certain reserve of power which is used only exceptionally, as when unusual or prolonged exertion is made. The heart with a valvular lesion (defect or injury) has less reserve, or it may have none, so that the least extra effort or even slow walking may make the patient out of breath and otherwise disturbed. When the heart is overtaxed its muscle relaxes and the heart dilates.

The commonest cause of disease of a valve of the heart is rheumatism. Any severe fever may also be a cause; as also worry, grief, or any cause of arterio-sclerosis (which see).

The **symptoms** of heart disease vary from very slight ones to the most pronounced, such as headache, dizziness, fainting fits, palpitation, pain about the heart, shortness of breath, cough, scanty urine, swelling of the feet, etc. It may take the best ability of a good physician to determine whether the heart is diseased or not, and he must examine the patient both before and after muscular exercise, also in

different positions, as lying down, sitting, and standing, as well as on different days, particularly when the patient is very tired. Of course any of the above symptoms may be present, although the heart is perfectly sound; and, on the other hand, the heart disease may be discovered accidentally, as during examination for life-insurance. Usually, when a person goes to a doctor on account of heart complaint (pains about the heart), there is no disease of the heart; but there is indigestion. The heart lies right above the stomach and may be embarrassed by upward pressure by the latter when it is distended by food or owing to indigestion.

Treatment.—A person with a disabled heart must live a quiet life, avoiding excitement, over-exertion, exposure to cold or wet, and any kind of excess. The general health should be kept as good as possible. The heart is simply a great muscle, and anything that is good for one's muscular strength is good for the heart. An outdoor life is desirable for a heart patient; and the diet should be nutritious and moderate in amount, while the bowels, kidneys and skin should be attended to.

When there has been a failure of compensation (a "breakdown" of the heart) the patient must have **rest**—as complete rest as possible—in bed. Morphine, to give the patient a sound sleep each night for a few days, is the most valuable drug. It is also an excellent tonic to the heart. Digitalis or foxglove is likewise useful. It should be used only under the advice of a doctor. If there is anemia, iron or arsenic may be required. Strychnia or nux vomica is also an excellent tonic, both to the heart and to the stomach and nervous system.

Other diseases of the heart, besides that due to defective valves, include "fatty heart" and nervous disorders. In the former the muscle is partly replaced by fat, and the heart is weakened.

Arterio-sclerosis is a disease in which the walls of the arteries are thickened and hardened. This is a condition which is natural in old age, indeed it is the true gauge of a person's age, as is well expressed in the medical maxim, "A man is as old as his arteries." The thickening of the arteries causes a loss of their elasticity, and hence interferes with the circulation, which is dependent in part on the alternate expansion and contraction of the arteries, by which the blood is made to flow steadily forward.

At first the wall is merely thickened by an increase of the fibrous tissue. In an advanced state of arterio-sclerosis the walls of the arteries are calcified (have lime deposited in them) and become brittle and liable to rupture. The parts most apt to be specially affected are the heart, the kidneys, and the brain, resulting in sudden

death from heart failure, or in Bright's disease of the kidney's, or in apoplexy from a ruptured artery in the brain.

The **causes** include poisoning by lead, by syphilis, by alcohol, by constipation, or by any severe fever, such as typhoid. Over-exertion at work or in athletic sports, excesses, especially over-eating and worry, are other causes. Prevention consists in avoiding the causes stated above, and in all those measures which preserve health and defer the onset of old age.

Angina Pectoris, or Spasm of the Heart, is one of the most formidable and painful of the affections which terminate human life; it occurs more generally after middle age and is more frequent in men than women. The attack is characterized by the sudden onset of agonizing pain, referred to the center of the chest, or a little to the left side of it, passing through to the spine, up to the left shoulder, and down the arm of the same side even to the extremities of the fingers. Sometimes both arms are affected. Along with the pain, which is always said to be agony beyond description, there is a sensation as of instant impending death. The paroxysm ceases as suddenly as it comes on. Angina pectoris may be preceded by warning symptoms, palpitation, shortness of breathing, indigestion, or it may come on unheralded by any of these, generally during some slight exertion, as walking up hill, or against a strong wind, or during strong mental emotion, but not unfrequently in the night, after the first sleep. An attack of angina pectoris is an emergency affecting life, to which there are few equals; full, instant stimulation is demanded, and the first agent of the kind at hand must be used, till other remedies and proper assistance can be procured. A glass of spirits and water as hot and strong as it can be swallowed, and with it, if procurable instantly, forty drops of laudanum must at once be given. A strong mustard poultice is to be applied immediately to the front of the chest, and the same between the shoulders—hot applications to the feet. If the paroxysm be not subdued in a quarter of an hour, the stimulant is to be repeated with half the quantity of laudanum, and this again, after the same interval, if requisite. Spirits have been mentioned as being the most readily procurable, but when ether and sal volatile, either one or other, or both, are at hand, they are preferable, and must be given in just so much water as will permit of their being swallowed; a teaspoonful of each with thirty drops of laudanum. A person who has once suffered an attack of angina should never be without these three requisites, laudanum, ether and sal volatile. Nitroglycerin and amyl nitrite are very valuable in giving quick relief, and either of these should always be at hand to anyone who is subject to angina. It is needless, perhaps, to say that all these measures of an emergency in which not a moment is to be lost, are while waiting the arrival of the medical attendant, and that to him must be entrusted the direction of that regulated mode of life which must ever be adopted after an attack of this disease. The treatment of the emergency it may be highly important for an unprofessional person to be acquainted with, that of the interval, which may extend to months or even years, with care, must be left in the hands of educated skill alone. Within the last few years we have, in nitrite of amyl, the most effectual and rapidly-acting remedy in cases of heart-spasm. From two to four minims may be dropped on a piece of lint and the vapor cautiously inhaled. Persons who suffer from attacks of heart-spasm fre-

quently carry about with them a little stoppered bottle containing a small amount of amyl, finding a few sniffs sufficient to ward off an attack. Or nitroglycerin (also termed glonoin), may be carried in tablet form and a tablet taken when necessary.

Anemia, Chlorosis; "Watery or Thin Blood," is a condition in which the quality of the blood is deficient in its red globules, or coloring portions, more especially. It is common in young females, especially about the ages of 15 to 25. The pallor of all those portions of the body, such as the lips, which are usually well-colored, sufficiently indicates the disease. Anemia may arise from deficient nourishment, unhealthy situation, extreme loss of blood, or may be of constitutional origin. In the former case, it is generally quickly recovered from, if the constitution be a good one, under the use of iron and good living; in the latter case, it often requires long and patient perseverance in these and other means to effect a cure. General languor and listlessness, very heavy sleep, headache, mental debility, impaired, capricious or depraved appetite, constipated bowels, swelling of the feet, shortness of breath, palpitation of the heart, are the general accompaniments of anemia; the monthly secretion is either absent or very pale. The cause of anemia is still obscure, but the direct cause of the symptoms is undoubtedly poverty of the blood, and to this the treatment must be directed. Iron in solution or pill is the main medicine. (See Iron.) An old and good form of iron is the tincture of iron perchloride. The dose is five to fifteen drops in half a glassful of water twice or three times a day a few minutes after meals. If the appetite is deficient, and does not improve, a dose of tonic bitter (quinine, salicine or gentian), must be given along with, or substituted for, one dose of iron. Cod-liver oil is also useful. The diet must be generous; fresh meat twice a day, eggs if preferred, puddings in small proportion, and bread partly substituted for vegetables. Malt liquor, especially porter, to the extent of one of the usual pint bottles, may be taken in divided portions, daily, or a couple of glasses of port wine, if the former disagrees. An anemic patient ought to retire to rest by ten o'clock, and to rise, as a general rule, by half-past seven, but ought never to delay breakfast beyond the mere time required for dressing; going out before the meal is quite out of the question, and, indeed, in some cases, where there is a tendency to fainting, it is better to have a cup of coffee, or warm milk, before rising. The bowels must be moved freely each day. *Cascara sagrada* is excellent for this. (See Index.) The skin must be attended to, and in many cases a cold sponge bath is of great service, while in others tepid sponging only can be borne. The bed should be a hair mattress. Exercise in the open air on foot or horseback must be regular, but not carried beyond comfortable fatigue. Change of air to the seaside is of service. Mothers are often anxious about the non-appearance of the monthly discharge; its absence is but a symptom of the disease, and it is better that the constitution should not be drained even by it, until it is able to support it. Such are the general rules respecting anemia, but a confirmed case should always be submitted to the medical man—causes may be aggravating, or effects, such as consumption, springing from the disease, which he alone can detect. Moreover, in extreme cases of this disease, sudden death has occurred.

Leuchaemia is a disease of the bone-marrow, spleen or lymph glands, in which the white blood corpuscles are enormously increased in number. It can be diagnosed only by a skilled examination of the blood, and the treatment, which is difficult, must be in the hands of an able doctor.

PART SEVEN—*Food and Sanitation*

How to Avoid Disease

Careful Examination of the Food We Eat and the Water We Drink

The Temperature and Moisture of the Air We
Breathe.

The Habits We Practice.

The Exercises We Take.

Subject Reference.

For Special Poisons Injurious to Health and Destructive of Life, see Vol. I, pages 476 to 504.

CAUSE AND PREVENTION OF DISEASE.

Age and Prolongation of Life.

INSTRUCTION FIFTY-ONE—*Diseased Animals*

Symptoms and Features of Disease.

Even the well-trained and experienced veterinary surgeon, when he is called in to decide whether meat comes from a diseased animal, and if so, to determine the nature of the disease, is often at fault. And yet it is most important, in the interests of the public, that traffic in diseased meat, which, in spite of inspection is still carried on to a scandalous extent, and, especially when infectious disease is prevalent among animals, should be kept in check. It will be well, therefore, to discuss the leading symptoms and features of the principal diseases which affect animals whose flesh is used for human food. The main points which characterize **healthy** living animals, briefly summarized, are these: The animal's **coat** should be in good condition, the skin supple and free from scabs, pustules, or sores of any kind. The animal itself should be well-fed and able to move about **without signs of stiffness** or lameness. Its **mouth and nostrils** should be free from any discharge, and its **breath** from offensive odor, while the breathing should be easy and noiseless. Its **eyes** should be bright, and it should give **no signs of shivering** or being in pain.

The most prominent diseases which render the flesh of animals unfit for human food are—cattle-plague, contagious pleuro-pneumonia, anthrax and anthracoid diseases, foot-and-mouth disease, varioloid disease, tuberculosis, arthritis, measles, puerperal fever, acute rheumatism, actinomycosis, rot in sheep, pig-typhoid, pig-measles, trichiniasis, fowl-cholera, and acute febrile disorders or fevers from whatever cause.

1. **Cattle-plague.** This is highly contagious, but somewhat difficult to diagnose in its early stages. From the first, however, the temperature is variable and rises, the hair becomes dull and erect, the appetite fails, and after a time there is a frequent, dry, short cough. The mucous membrane (lining of eyes, nose, mouth, etc.) becomes red and soon covered with patches, and a glairy discharge sets in from the eyes, nose, and mouth, and, in cows and heifers, from the vulva, or genital orifice. The ears droop, the secretion of tears becomes copious, there is much shivering and transient muscular contraction, and the animal becomes very restless and sometimes delirious. In a short time purging sets in, and in most cases an eruption appears on the inside of the thighs, udder, and loins.

When the animal is killed the whole internal tract is found to be reddened and congested, spots of blood are generally present in the later stages on the intestines and heart, while the inside of the intestines is covered with a blood-colored glairy fluid. Except in advanced stages of the disease, the flesh is not much changed in appearance, but it does not set well. When the disease is well developed the flesh is dark, flabby, and has a disagreeable smell, and often crackles, owing to gas in the tissues.

The propriety of using the flesh of animals killed when suffering from this disease has been discussed for more than a century; but its destruction is now absolutely enjoined.

2. **Contagious Pleuro-pneumonia**, though it sometimes attacks sheep and swine, is more especially a cattle disease. The early symptoms are generally slow and insidious, but from the first there is a rise in the temperature, the appetite becomes less keen, the coat becomes rough and loses its luster, and eventually a dry, short cough sets in. Later on the breathing becomes labored, and in coughing the back is arched, and the head and neck extended. At this stage, or even earlier, auscultation and percussion, more particularly over the lower lobes of the lung, will reveal the true nature of the disease. When the animal is slaughtered the lining membranes of the chest and lungs will be found to be rough and thickened, and covered more or less with a coating, while the chest cavity is often distended with a large amount of pus-like fluid. In the early stages the lungs are grayish with red or purple patches, and they become less spongy. Later on they are dark and marbled in appearance, resisting and solid on being cut and pieces cut off sink readily in water, while their weight is often increased ten or thirty pounds, or more.

The flesh usually looks dark and harsh in appearance, and the fat

is yellow tinged. In order to palm the meat off as sound meat, butchers often strip off the lining membrane from the walls of the chest and smear them with fat, but this may be readily detected on examination. So far as inspection is concerned, it will generally be found that, no matter whether the meat is much diseased or not, **it is exposed for sale as sound meat**, and as it is thus palmed off on the public under a fictitious character, there ought to be no hesitation in condemning it, especially when the history of the carcass can be fully traced.

When the disease attacks the pig or sheep the same changes will be found in the lungs and on the pleura, while the intestines are often inflamed and marked here and there with dark patches.

3. **Anthrax and Anthracoid Diseases.**—From the remotest times these diseases have given rise to widespread and most fatal epidemics, not only among domesticated animals, but among many wild animals. The specific contagium or direct cause of the disease is the **Bacillus anthracis**, and these bacilli crowd the blood of the diseased animal to such an enormous extent that as many as eight or ten millions exist in a single drop. Fleming divided these diseases into two classes—the general and localized—the former known as splenic apoplexy or anthrax fever, and the latter as carbuncular or anthracoid erysipelas. Other writers distinguish a third form, called **black-quarter** or **black-leg**, characterized by the swelling and dark-colored appearance of one of the fore or hind quarters. In anthrax fever the disease generally runs a very brief course, sometimes the animals falling as if shot or slain. In other cases, the animals commence to tremble and stagger, the breathing becomes hurried, the pulse rapid, and there is a bloody discharge from the mouth, nostrils, and other passages. In the early stage of the disease there is usually marked thirst, and during the later stage the temperature falls.

Localized anthrax presents in two forms—the erysipelatous and the carbuncular. In both varieties there is swelling under the skin and between the muscles, but in the latter this is more or less circumscribed, or limited, in the form of tumors under the skin, mucous membranes, and in the connective tissue. In both there is extreme venous congestion, and as a consequence bleeding into the tissues in places is numerous and well marked. The liver, kidneys, and lungs are congested, often greatly enlarged, and friable. But the most characteristic feature of the disease is the enlargement of the spleen,—the pulp of that organ being transformed into a violet or black fluid mass. The flesh is often flabby and dropsical, and rapidly passes into

a state of putrefaction; while dropsical effusion may generally be detected between the lobes of fat surrounding the kidneys.

In anthracoid disease of the pig the chief symptoms are thirst, loss of appetite, rigors, hurried respiration, and feverishness. If death does not ensue rapidly, as in the apoplectic form, the snout becomes of a leaden hue, and the ears, belly, and inner surface of the thighs become covered with red patches which deepen in color. In the later stages of the disease, as in cattle, the temperature falls, the body becomes cold, and there is a slimy pus discharge from the eyes. The carcass of a pig thus affected is livid, red, or mottled over most of the surface, the spleen is enlarged, and the flesh is sodden and darker in color, while blood-colored patches are generally found on the heart and intestines.

Sheep are more liable to the apoplectic form of the disease than other domesticated animals, and it especially attacks those that are well bred. In the majority of cases there are no apparent premonitory symptoms, the animal often falling down while grazing, and dying in convulsions within a few minutes. In other cases, which are not so rapid in their course, it is observed that the sheep is dull, carries its head low, does not eat, appears uneasy, and, if the herd is moving, drops behind. Its breathing is hurried, the pulse is rapid, the conjunctival membrane congested, and the lower lip becomes marked with patches of a violet hue. When the disease is fully developed, the animal suffers from tremblings, so that it can no longer stand; and there is bloody discharge from the mouth, nostrils, and other passages. Sometimes there is swelling of the neck and flanks; and eventually convulsions set in. External tumors are rarely to be met with in sheep, and then mostly on the head, udder, or inside of thighs. The more common form of the **localized** disease is a diffused erysipelas. In Scotland the splenic apoplexy of sheep is known as **braxy**. The flesh is very dark and often dropsical, and the spleen is increased in weight from two to six ounces.

The **uncooked** or **imperfectly cooked** flesh of animals slaughtered for anthrax is extremely dangerous, and numerous widespread and fatal outbreaks of disease in man have been traced to the consumption of food of this description. But if **well cooked**, it is said that accidents are rare. It need hardly be said, however, that, taking into consideration the great risk, not only of eating but also of handling such meat, the flesh of all animals slaughtered when suffering from the disease, or even when suspected to be infected, should be condemned and destroyed.

4. **Foot-and-Mouth Disease.**—This disease is highly infectious, and attacks cattle, sheep, pigs, and other animals. It is characterized by a rise of temperature and an eruption of small vesicles (watery pimples) in the mouth and on the tongue, sometimes extending to the nostrils. It also appears in the cleft and round the top of the hoof; while in cows, ewes, and sows, the teats and udders are commonly affected. The vesicles, though small at first, often become large and confluent, and when they burst they leave bare red spots, which sometimes suppurate. Inside the mouth the vesicles burst soon after they are formed, and in cattle the saliva often becomes tinged with blood. When the limbs are affected the coronet (just above the hoof) becomes red and swollen, and the animal lame. Sometimes the hoof may be loosened or shed. Occasionally, and more particularly in sheep, the mouth and tongue are affected, or the feet may be very slightly affected without the appearance of vesicles. In severe cases there is much fever, prostration, and thirst; while in sucking animals the disease frequently extends to the pharynx, larynx, and small intestines, and is sometimes of such severity as to induce typhoid symptoms. Except in severe cases, the flesh of animals slaughtered cannot be distinguished from the flesh of healthy animals, and may be passed, but the head, udders, and feet should always be rejected. If, however, the disease has been severe, and there are signs of inflammation or abscesses, or if the flesh is flabby, watery, ill-fed, and sets badly, it ought to be condemned.

Somewhat allied to foot-and-mouth disease, and occasionally mistaken for it, is contagious **foot-rot** of sheep, which is mainly distinguished from the former by the absence of mouth symptoms. It is in reality a chronic inflammation and ulceration of the soft parts of the feet, and it attacks more especially the purest breeds. It is characterized by lameness and suppuration, which often leads to shedding of the hoof. Except in cases when the inflammation extends to the carcass, and induces irritative fever and emaciation, the meat may be passed, provided it sets well, but the feet should always be condemned.

5. **Varioloid Disease.**—This disease in cattle, known as cow-pox, is generally so mild and rare that it only merits passing notice. After slight febrile disturbance, which often passes unnoticed, the udder is observed to be swollen near the teats, and in a few days small, hard tumors about the size of a pea or bean appear on the teats and udder. These “pocks” gradually increase in size, and attain their maximum development on the eighth or tenth day, when they become purulent

(filled with pus), and a crust forms which becomes detached on the eleventh to the fifteenth day. If used for vaccination, the vaccine matter is collected from the eighth to the tenth day before it becomes purulent, and it is at this stage that the disease is most likely to be conveyed to the hands of milkers. Except in very rare instances, the disease runs a mild course.

The disease as it affects sheep is highly contagious and often extremely fatal. After two or three days of more or less severe febrile disturbance, an eruption, at first resembling flea-bites, appears on the inner aspect of the thighs, chest, and belly, extending over the whole body. Towards the fourth or fifth day the eruption becomes vesicular, and afterwards pustular. The eruption often extends to the mouth and nostrils, and the wool readily comes off. Except in the early stages of the disease, the flesh of slaughtered animals has a disagreeable odor, and even in suspected cases is altogether unfit for human food.

In swine the symptoms of variola are not unlike those of sheep-pox, and the eruption runs a similar course. The disease is highly contagious, and the flesh of slaughtered animals ought always to be condemned. The common and fatal disease, **sheep-scab**, which is caused by a parasite known as the *Psoroptes ovis*, usually disfigures the carcass so much that the flesh is not exposed for sale, and if exposed would be found to be flabby and emaciated.

6. **Tuberculosis**, or consumption, more popularly known as **pearl disease** or the **grapes**, is a disease which specially affects cattle, and is most common among cows which are kept fastened up in crowded town cow-houses. The disease is slow and insidious in its onset, and may not be suspected until the animal loses in condition and begins to suffer from cough. The pearls or nodules, small at first, but gradually increasing in size, occur on the inside of the walls of the chest, the surface of the lungs, and, as the disease advances, the lungs themselves become affected, and eventually cavities are formed. Although the most common seats of the disease are the lungs, pleura, and other serous membranes, the liver, lymphatic, and other glands are often affected, and bacilli have been detected in the flesh. On cutting open the nodules they are found to consist of cheesy-looking matter of the same consistence throughout, or softening towards the center, and in all tuberculous deposits or discharges Koch's tubercle **bacillus** occurs.

The flesh of animals slaughtered in the early stage of the disease may not present any features differing from those of sound meat, but

in the more advanced stage it is pale, flabby, and poorly nourished, and should be unhesitatingly condemned. The signs of adhesions between the lungs and the walls of the chest should be carefully looked for, and the lymph-glands should be examined.

Bacilli have been frequently discovered in the milk of tuberculous cows, even when the udders are not affected; there can be no question that all such milk should be unhesitatingly condemned.

Tuberculosis is also common among pigs, cats, poultry, pigeons, and pheasants, and in respect to these the same rule of condemning as unfit for food should apply. The disease in fowls is commonly known as **croup** or **diphtheria**.

7. **Arthritis** in cattle is commonly known as "**joint-ill**" or "**joint-felon**." The prominent symptoms are lameness and inability to rise, feverishness, and swelling of the joints. The watery fluid which is effused into the joints may subsequently become pus, and abscesses are occasionally found in other parts. Frequently the meat becomes dropsical and should be condemned.

8. **Puerperal or milk-fever** not unfrequently attacks cows after calving, and if the animal is slaughtered when suffering from the disease the meat is certainly unfit for human food. The signs of recent parturition will be apparent, and the flesh will generally be found to be sodden and congested. If the slaughtering is due to some complication in calving or lambing, and the carcass is frankly submitted for inspection, it may be passed if the meat sets well and does not show signs of congestion. In malignant fever after giving birth, so common among sheep, the carcass should always be condemned.

9. **Rot in Sheep**.—This disease is the most devastating of all diseases which attack sheep. Its essential cause is the presence in the bile-ducts of the liver of "**flukes**," small animals shaped like a sole, measuring from about an inch to an inch and a half in length, and when once seen can always be recognized. These flukes attach themselves to the sides of the bile-ducts by means of suckers, and in the later stages of the disease are present in such large numbers that the ducts often become completely blocked up, and even burst, so that the substance of the liver becomes broken down. The prominent symptoms of the disease are dulness and sluggishness, and yellowness of the eyes; the wool drops off, the animal becomes emaciated and, as a rule, dropsical. The flesh is found to be thin, watery; and flabby, and the tissues are more or less bile-stained. When the disease becomes pronounced, the flesh is undoubtedly unfit for human food, but the

presence of a few flukes in the liver would not warrant the seizure of a carcase, provided the meat looked healthy.

10. **Actinomycosis.**—This disease, though not by any means a new disease, has only been more fully understood of recent years. Like tuberculosis, it is communicated to man, and sometimes so closely resembles that disease that it may be mistaken for it; but its real nature is indicated by the presence of a vegetable micro-organism known as the “ray or fission fungus.” The disease is more common among cattle than sheep, and appears in the form of tumors, ulcerations, and abscesses in various parts, but more especially in the head and neck. The new growths characteristic of the disease may, however, attack the tongue, jaw, gullet, nasal cavities or lungs, and according to their location have been called “wens,” “polypi,” “cancer of tongue,” “lung tubercle,” “bone tubercle,” “lump jaw,” or “lumpy jaw.” The tumors, or growths, when cut through, have a honeycombed appearance, and in the bands of tissue are found the characteristic fungus tufts and yellowish pus. In the United States, where the disease is common, the flesh of all animals suffering from the disease is condemned as unfit for human food.

11. **Pig-typhoid or Hog-cholera.**—The symptoms bear a close resemblance to those already described under anthracoid disease. The premonitory symptoms are feverishness, restlessness, and rapidity of breathing, after which an eruption begins to appear on the skin, which may be red and patchy, when the disease is called “red soldier,” or of a livid tint, when it is sometimes designated “blue soldier.” The redness of the skin generally extends through the fat beneath to the muscular tissues, and the intestines often become marked with extravasations. Butchers, in order to disguise the character of the meat, sometimes rub the edges of the reddened fat with salt, but by scraping with a knife, or making a fresh incision, this attempt at deception may readily be detected. The lungs are generally found to be congested, or in parts more or less solidified. When the skin eruption is well marked it is seldom that the meat is exposed for sale. The eruption sometimes bears a close resemblance to smallpox, pus being secreted and followed by the formation of crusts. The flesh of all pigs, whether suffering or suspected to be suffering from this disease, should be condemned.

12. **Quinsy, or “strangles,”** is a disease which sometimes attacks pigs. It is characterized by sore throat and swelling in the neck, which may extend into the fore-quarters. The premonitory symp-

toms are labored breathing, refusal of food, and swelling about the throat, which looks red or livid. The flesh is unfit for human food.

13. **Trichiniasis** or **Trichinosis** is a disease which infests a number of animals, but the chief interest attaching to it is the fact that it is a disease to which pigs are liable, and this is transmissible to man by eating diseased pork. The cause of the disease is the presence of a parasite known as the *Trichina spiralis* in the muscular tissue of the pig. These parasites are found to exist in three conditions in the animal body—as intestinal, as embryonic, or as muscular trichinæ.

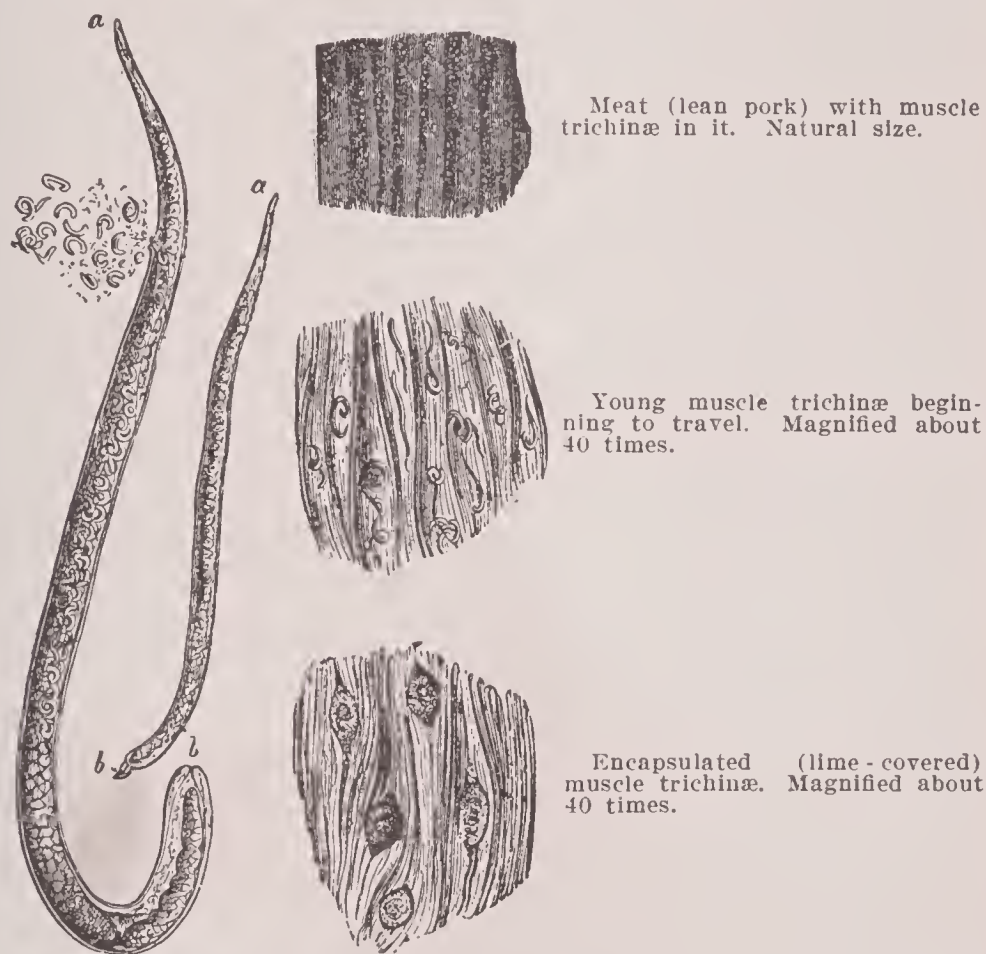


Fig. 317.

Female (the larger) and male intestinal trichinæ, magnified about 250 times. a. Tail, and b, head end. In the interior of the female are seen eggs (near the head) and living young ones which are escaping through the genital opening, c.

During the period of reproductive activity they inhabit the intestines; in their course of migration they penetrate the intestinal wall, fall into the abdominal cavity, and are discovered earliest in the muscles which inclose this cavity, viz, the diaphragm and abdominal muscles. Other muscles become subsequently infested—the intercostals (between the ribs), muscles of the neck, head, and back, and last of all the muscles of the limbs and tail. In these different regions of the

muscular system they continue their development, become at length encysted (or inclosed in a strong white fibrous covering), and then remain perfectly stationary. Their further development depends upon whether or not the trichinosed flesh is eaten in an uncooked or imperfectly cooked state, when they again pass through similar stages in the newly infested animal, that is to say, breed in the intestines and migrate to the muscular tissues, and in this way they infest man.

In searching for trichinæ in pork, the muscles most liable to be infested should be selected, such as the diaphragm or midriff, masticatory muscles near their insertion, or intercostal muscles, and the aid of a powerful pocket-lens or microscope is necessary. But without the microscope the eye may discern a paleness and œdematous condition of the flesh if the trichinæ are very numerous, while the flesh itself presents a speckled appearance. These small white specks are the spherical or oval cysts in which the parasites are coiled up, and sometimes they feel gritty owing to the presence of carbonate of lime. In order to examine them microscopically, a very thin shaving of the flesh in the direction of the muscular fibrillæ should be placed on a glass slip and soaked in a solution of potash (one to eight or ten of water), but for only a few minutes. The section should then be teased out with needles, protected by a covering glass, and placed in the field of a microscope with a magnifying power of 50 to 200 diameters. If the capsule is thick and opaque, owing to the presence of carbonate of lime, a drop of weak solution of hydrochloric acid will render it transparent; and should a little fat obstruct the view, a drop of ether or benzin will remove it. The fully developed trichinæ must be looked for in the small intestines, more particularly in the layer of mucus covering the lining membrane of the duodenum. In the migratory stage of the undeveloped trichinæ, and before they become encysted, a high power is necessary for their detection. Swine infested with the disease may not present any noticeable symptoms during life. The flesh should invariably be condemned. Thorough cooking is the only safe way of protecting against this disease when pork is eaten at all.

14. . "Measles" in the Pig.—This disease, like the preceding, is due to a parasite, the *Cysticercus cellulosus*. It is much larger than the *Trichina spiralis*, and is developed from the eggs of the human tapeworm (*Tænia solium*), which are expelled from the intestine along with the fæces. These eggs are swallowed by the pig when it devours infested feces, and the embryos which they contain are developed into "hydatids." Each embryo is provided with six hooklets, and soon

after being introduced into the interior of its host, it commences to penetrate the tissues in its immediate neighborhood, until it has reached a favorable position, when it assumes the bladder form. This it maintains permanently, unless it is transferred by the meat, which it infests, to the intestinal canal of man, when it develops into the fully matured tapeworm. Unlike the cysts of the *Trichina spiralis*, which are embedded in the substance of the muscular fibrillæ, these bladders are found **between** the muscular fibers, and often on the surface of the muscles. To examine one of these bladders, it should be put on a glass-slip and incised, when, with the aid of a good pocket-lens, the worm will be found curled up in the cavity. It is about one-third of an inch in its longest diameter, or varying from the size of a pea to that of a cherry, and in its retracted state it is somewhat oval or elliptical. In order to examine the head it is necessary to extract it from its cavity or **receptaculum** with fine needles, when it is found to be square-shaped if viewed from above, and conical when viewed in profile. It is furnished with four muscular suckers, and the small depression at the apex of the head is surrounded with hooklets, varying from twenty-four to twenty-eight in number, which, when once seen, cannot be mistaken. The muscles of the tongue, neck, and shoulders are most liable to become infested, and next in order the intercostal muscles, and those of the lumbar region, loins, and thighs.

The disease more particularly affects young pigs, and those verging on maturity. The symptoms are very variable, and in mild cases the disease may not be suspected. If suspected, it is usual to examine the under surface of the tongue, when frequently the little bladders may be felt or seen. In the more advanced stage of the disease they may be detected under the tail, round the ears, or in the conjunctival membrane of the eye. When the disease becomes general and severe there is loss of appetite, the animal becomes stiff and awkward in its movements, and swellings are more particularly observed around the withers. Pork infested with these parasites is called **measly**, owing to the characteristic appearance of the flesh on section. When the flesh is dried or salted, the cysts shrink, and in order to detect them a small slice should be steeped in water. The flesh of measled pigs should not be used as food, even though the hydatids may apparently be few in number.

"Measles" in the ox, like pig-measles, is also parasitic, the cause of which is a human tapeworm infesting the small intestine. The symptoms of the disease and the appearance of the infested flesh and cysts so closely resemble those already described for the **Cysticercus**

cellulosus in the pig that no further description is necessary. The meat should be condemned.

There is another parasite living in the lungs of sheep or oxen. It is the **filaria**, a thin worm from half an inch to three inches in length. It is not a common disease, and unless it induces severe inflammation of the lungs, fever, and emaciation, the meat may be passed as fit for use.

Immature veal or lamb should be condemned as unfit for food if the animals have been born prematurely, or have died during birth, when the flesh is known as "slink meat." The flesh of animals may become unwholesome owing to the animals having been accidentally or maliciously poisoned, and in these cases the meat may look perfectly healthy provided the animal has been slaughtered. In suspicious cases of this description, the stomach and intestines should be carefully examined for traces of inflammation, and the first stomach, for pieces of meadow-saffron, bryony, or yew-leaves, etc. The flesh of animals slaughtered on account of accident may be passed, provided that the accident has not led to severe febrile disturbance, and the meat sets well; but if the animal has died from accident, the meat should be condemned, because the carcass has not been bled. The flesh is dark in color, full of blood, sets badly, and rapidly decomposes.

INSTRUCTION FIFTY-TWO—*Examination of Food*

Subject Reference.

For Instructions Regarding Milk Supply and Sterilization of Milk for Infants and Children, see Vol. 1, pages 538 to 578.

How to Avoid Diseased Meats and Decayed Vegetables

Also Impure Milk, Butter and Other Supplies When Purchasing from the Dealer.

Selection of Meats.

1. Butcher Meat.—A healthy carcass should be well bled, no part of it being dark or speckled, bruised or bile-stained. The meat should set well, as soon as the carcass cools, and should not present an emaciated appearance. It should not be flabby nor pit on pressure, nor should it crackle, because this would indicate the presence of air or gas in the flesh.

When a carcass is inspected, the offal should be inspected too, and it should always arouse suspicion if the butcher says he has destroyed

or thrown away the offal, and cannot produce it. In oxen and sheep the offal consists of the head, hide, feet, and all the internal organs with the exception of the kidneys; but in pigs the head, feet, and skin form part of the carcase. In examining the offal it should be noted if the skin is free from sores or pustules, if there are signs of bruising, and if the hoofs are healthy looking and firmly attached to the feet. The mouth and tongue should be free from patches or ulcers. The internal lining of the stomach should present no signs of inflammation, and should have no smell of physic, while the intestines should have a smooth, uninflamed lining, and be free from ulcers or patches. The liver should not be friable, but should be of a rich brown color and free from abscesses or flukes. The spleen should be a gray color outside, thin, long, and sharp (not rounded) at the edges, and on section should be dark inside. The lungs should be of a pink, bright color, and spongy, and portions cut off should float in water. They should also be free from cavities, pus, or worms, and their surfaces should present no signs of inflammatory patches or recent adhesions.

In order to acquire a practical knowledge of the healthy appearance of sound butcher meat, whether in a carcase or cut up for sale, make repeated inspections of the contents of a butcher's shop whose trade is above suspicion, and, also, visits to the slaughter-house, with careful examination of the various parts of the offal, and particular attention to the usual way in which carcasses are dressed. A knowledge of unsound meat and diseased offal would be most readily gained by accompanying a meat inspector on his rounds in one of our large towns.

The characters of good meat may be enumerated as follows:

(1) Cutting it should present a marbled appearance from intermixture of streaks of fat with muscle. This shows that the animal has been well fed.

(2) The color of the muscle should neither be too pale nor too dark. If pale and moist, it indicates that the animal was young or diseased; and if dark or livid, it shows that in all probability the animal was not slaughtered, but died with the blood in it. The muscles in pork, veal, and lamb are pale.

(3) Both muscle and fat should be firm to the touch, not wet or sodden. The latter should be free from hemorrhagic points, and the suet fat should be hard and white.

(4) Any juice exuding from the meat should be small in quantity, of a reddish tint, and give a distinctly acid reaction to litmus-paper, i. e., should turn it red. Good meat should dry on the surface

after standing a day or two, and so long as it yields an acid reaction there is no decided putridity. The juice of bad meat is alkaline or neutral.

(5) The bundles of small muscle fibers should not be large and coarse, nor should there be any mucilaginous or pus-like fluid in the intermuscular tissue.

(6) The odor should be slight, and not by any means disagreeable. An unpleasant odor indicates commencing putrefactive change, or that the meat is diseased. By chopping a portion of the meat into small pieces, and afterwards drenching it with warm water, any unpleasantness of odor will be more readily detected. Another good plan is to thrust a long, clean knife or skewer into the flesh, and smell it after withdrawal.

(7) When meat is salted, the brine should not become sour or offensive.

When meat becomes bad through partial decomposition, owing to its having been kept too long, its chief characteristic is an offensive or putrid smell. The external surface is pale or livid and, at a later stage, greenish. The meat is soft, tears easily, and loses its elasticity, and the juice is alkaline or neutral. The flesh of animals which have not been slaughtered, or only slaughtered when in a dying state, is dark in color, and often purple, full of blood, sets badly, and readily decomposes. Diseased meat is usually sodden and flabby, often emaciated, with the fat discolored or gelatinous-looking, and the smell unpleasant and sickly. The ribs should always be examined for pleuritic adhesions, while in all cases the flanks should be looked to, because it is generally in these parts that putrefactive change first sets in. When the offal can be obtained for inspection the various organs should be minutely examined, but it is seldom that the butcher who wishes to sell diseased meat leaves any of them exposed to the risk of detection, and this, as already said, should always arouse suspicion. If parasitic disease is suspected, the muscular fiber should be examined under the microscope. *Cysticerci*, though generally visible to the naked eye, can be accurately detected under a low power or by means of a good pocket-lens, and the hooklets should be always seen. In searching for *trichinæ*, it should be remembered, as previously stated, that the parts most likely to be infested are the diaphragm, the intercostal muscles, and the muscles of the flank.

Any departure from the natural color of the flesh of a slaughtered animal should arouse suspicion. A magenta hue, a dark reddish-brown or black hue, or a mahogany hue, are all of them indicative

of diseased conditions, while a greenish hue is a sure sign of decomposition or gangrene. Attention, too, has been directed to a phosphorescent appearance presented by meat in the dark such as is often presented by fish. Though this appearance is no doubt very rare, it would warrant the condemnation of the meat as indicative of grave changes.

When meat is seized, very often the defense is set up that it is intended for dogs' meat; but if it is found in the butcher's shop, or dressed in the usual way, there is generally very little difficulty in obtaining a conviction. In cases of this description which are brought before the magistrates, and likely to be strongly contested, it is always advisable, if possible, to get extraneous evidence concerning the previous history of the animal and the price at which it was sold.^o

There is no doubt that large quantities of diseased meat are used up in the making of sausages, and instances of serious illness arising from food of this description are not at all uncommon, especially when the sausages are not well cooked. Bad-smelling sausages, or sausages which have a nauseous or putrid taste, or a soft consistence in the interior, are highly dangerous and should always be condemned. Tinned meats, too, and so-called potted ham, are liable to putrefactive change, and should therefore be carefully examined, particularly as regards smell and taste, before being used.

2. **Horse-Flesh.**—The flesh of the horse is darker than that of the ox, and the muscular fiber coarser. The fat is also of a yellowish color, and softer. If the meat has not been boned there will be no difficulty in distinguishing it from ordinary butcher meat, because the bones and joints are much larger, and the ribs are more arched.

3. **Poultry.**—Good poultry should be fairly well fed, firm to the touch, and present a pink or yellowish color, while the smell should be fresh, and not unpleasant. Stale poultry becomes bluish in color, often green over the crop and abdomen, has a disagreeable odor, and the skin breaks readily.

Tuberculosis is a frequent disease not only of the poultry-yard but of the pigeon-loft and pheasantry. In poultry the affection has been variously described as **croup** or **roup**, **diphtheria** and **diphtheritic aphtha**, but the discovery of the **bacilli** of tuberculosis has served to dissipate these theories. The disease commences in most instances in the mucous membrane of the mouth, the nostrils, or the eye, then extends to the mouth and throat, and later on to the bowels, mesentery, and liver. In the lungs the disease presents a croupous appear-

ance, but in the walls of the crop and of the intestine, and in the liver, mesentery, and spleen, the disease shows as little bumps.

Fowl-cholera is another disease which may affect geese, ducks, turkeys, and pigeons, as well as domestic fowls. It is seldom, however, that any birds so affected are exposed for sale. The symptoms of fowl-cholera when the disease does not become rapidly fatal are briefly these: The feathers present a bristling appearance, the comb becomes limp and livid, the wings droop, the bird loses appetite and drinks much, and becomes swaying or dragging in its gait. Eventually diarrhea sets in, muco-purulent at first, and later on streaked with blood. If the bird dies or is killed and prepared for the market, the flesh is found to be somewhat redder than usual, the substance of the liver more friable, and the interior of the intestines marked with extravasations. Decomposition sets in rapidly.

4. **Game.**—According to modern ideas, game must be in a state of decomposition, or what is called more or less “gamey” or “high,” before it is considered to be fit for the table. It is therefore very difficult to decide when such a stage of decomposition has been reached as would warrant its rejection. But when the flesh becomes putrid, and the odor offensive, there is no doubt that it is unwholesome and should be condemned.

As already pointed out, tuberculosis is a disease to which game and rabbits are liable, and should any of the characteristic lesions be detected there should be no hesitation in condemning.

5. **Fish.**—Fresh fish should be firm, and without any disagreeable odor. If the whole fish is held out horizontally there should be very little drooping of the tail. The eye should be clear, and not sunken. The fish usually hawked about the streets is generally more or less limp and soft, and if it is found to be offensive as well, there is no doubt that decomposition has set in and that it is unwholesome. But fish which is apparently healthy often gives rise to serious symptoms, such as vomiting, diarrhea, and prostration. Herrings, pilchards and other kinds of fish may occasionally induce symptoms of poisoning, and it is not at all an uncommon occurrence to find a prickly rash following the eating of healthy shell-fish.

6. **Fruit and Vegetables** may become unwholesome from decay or disease, and the principal indications are softening, discoloration, or moldiness. Unripe food, such as windfall apples, are certainly unwholesome unless well cooked. Good potatoes should be of fair size, give no indications of disease on section, be firm to the touch, and when cooked should not be close or watery. Potatoes which have

been exposed to severe frost become soft and watery and are unfit for food.

Tinned fruits and vegetables, like tinned meats, are generally more or less contaminated with tin; but, as the metal is not poisonous except in large doses, the small amount which is generally found to be present is not injurious. Green peas, French beans, and other vegetables, such as pickles, are frequently adulterated with copper to retain the fresh, green color. This adulteration is no doubt injurious, and may readily be detected by leaving the clean blade of a knife in the liquor for a short time, when the copper will become deposited on the blade.

7. **Corn, wheat, barley, oats, rye, rice, and maize.** Smut, bunt, and ergot are the most common diseases affecting corn in this country, ergot especially affecting rye; bunt, wheat; and smut, barley and oats. They are all of them vegetable parasites, distinguishable under the microscope. Stored grain may become infested with an insect known as the weevil, or by *acari*, and, if stored when damp, may become unwholesome owing to fermentive changes.

8. **Flour.**—What is called good household flour or “seconds” should contain very little bran, be quite white, or only slightly tinged with yellow, and should give no acidity or musty flavor to the taste. It should not be lumpy or gritty to the touch, nor should it yield any odor of moldiness. When made into a paste with a little water, the dough should be coherent and stringy, and even in the dry state it should cohere when compressed.

The amount of gluten can be ascertained by washing away the starch carefully from a known quantity of flour, made first into a rather stiff dough, until the water comes off quite clear. The gluten remains, and, when baked or dried, should be clean-looking and should weigh at least 8 per cent of the quantity of flour taken for examination. A good flour will yield 10 to 12 per cent. Bad flour gives a dirty-looking gluten, which is deficient in cohesion, and cannot be drawn out into long threads.

Flour is sometimes adulterated with barley-meal, maize, rice, potato-starch, etc. Samples of doubtful quality should therefore be examined microscopically.

Adulterations with mineral substances, such as chalk, gypsum, or carbonate of magnesia, are best detected by burning a weighed quantity of flour down to the ash and weighing it; it should not exceed 2 per cent.

What is called "whole meal" should always be well ground, and should give no acid or moldy taste.

Oatmeal is generally roughly ground, and contains a fair amount of envelope freed from the husk. If husks are present the probability is that the meal has been adulterated with barley. The starch should not be discolored, and the meal itself should be agreeable to the palate. If the meal looks suspicious, it should be examined microscopically.

9. **Bread.**—The crust should be well baked, not burnt. The crumb should not be flaky or sodden, but regularly permeated with small cavities. The taste and smell should both be agreeable and free from acidity. Unless there is a considerable quantity of bran in the flour, as in whole-meal bread, the color should be white, not dark or dirty-looking. Bread is aerated with leaven or yeast, by kneading the flour with water charged with carbonic acid, or by mixing it with baking powder. Unleavened bread, and many kinds of cakes and biscuits, are not aerated.

Bread may become heavy and sodden owing to bad flour, bad yeast, or a gummy mixture of ground-rice. It may become sour owing to the quality of the flour, or to excess of fermentation, or it may become moldy owing to its having been kept too long, or stored in a damp place. Biscuits, and especially ship biscuits, are often attacked by weevils.

Good flour, well baked, yields about 136 lbs. of bread per 100 lbs. of flour, and adulteration is chiefly to increase this ratio by making the gluten hard and the bread more retentive of water. Ordinarily a 4-lb. loaf loses about $1\frac{1}{2}$ oz. in twenty-four hours, and about 5 oz. in forty-eight hours. Wheaten bread is sometimes adulterated with barley-meal, oatmeal, or boiled rice, and in order to improve its appearance when it is made from inferior, damaged, or adulterated flour, a small quantity of alum is added, generally less than 50 grs. to the 4-lb. loaf. The readiest test for alum in bread is the test known as the log-wood test. A tincture of log-wood is made by soaking 5 grams of log-wood chips in 100 cubic centimeters of strong alcohol, and a solution of ammonia is made by dissolving 15 grams of carbonate of ammonia in 100 cubic centimeters of distilled water. A teaspoonful of the tincture of log-wood and the same quantity of the ammonia solution are mixed with a wineglassful of water, and in this mixture a small crumb of the bread to be tested is allowed to remain for about five minutes. The bread is then removed, and dried at a gentle heat; if much alum is present, the bread dries of a dark blue

color; if only a little, the color is lavender; and if no alum be present, the bread dries of a dirty brown color. Or, if some of the bread be first soaked in the wineglass of water, the log-wood and ammonia then added, the water becomes a deep purple or blue if alum be present.

10. **Milk.**—Pure cows' milk, when placed in a tall, narrow glass vessel, should be perfectly opaque, of a full white color, free from deposit, and should yield from 8 to 12 per cent of cream by volume, the average being 10 per cent. When boiled it should not change in appearance, and when allowed to stand for some time there should be no deposit. As it is frequently adulterated with water, the specific gravity is an approximate test of the quality, and hence the use of the **lactometer**. The specific gravity varies from 1027 to 1036: if it falls below 1027 it shows that the milk is either very poor, or that a certain amount of water has been added. The following table indicates approximately the amount of water adulteration according to the specific gravity and percentage of cream:

	Specific gravity.	Percentage volume of cream.	Specific gravity when skimmed.
Genuine milk	1030	12.0	1032
Genuine milk, with 10 per cent water..	1027	10.5	1029
Genuine milk, with 20 per cent water..	1024	8.5	1026
Genuine milk, with 30 per cent water..	1021	6.0	1023
Genuine milk, with 40 per cent water..	1018	5.0	1019
Genuine milk, with 50 per cent water..	1015	4.5	1016

When milk stands from four to eight hours, the cream rises, and the remainder of the milk becomes less opaque. The quantity of cream which separates varies from 6 to 12 per cent, or even more—a small percentage of cream being always retained by the milk, even although it is allowed to stand for twenty-four hours. A much larger average percentage of cream can be obtained by the centrifugal apparatus, known as the “separator,” which is now largely used in dairies. The milk which is milked last at a single milking is called the “strip-pings,” and is much richer in cream than the milk first milked, called the “fore-milk.” Milk, too, varies very much in quality and quantity according to the breed of the cow, her age, health, number of pregnancies, the period which has elapsed since calving, and the nature of the food upon which she is fed. About twelve quarts is the daily average

yield, but immediately after calving the yield may be double this quantity.* The first milk obtained after calving is called **colostrum**, popularly known as "beestings." It is of a high specific gravity—about 1050—of a rich yellow color, clots very readily, and has a taste somewhat like beaten eggs. It ought not to be used until it presents a healthy appearance and taste.

To prevent dense clotting in the stomach, pearl barley water, well boiled and strained, may be used instead of water to dilute milk. All milk used for infant feeding should be boiled or sterilized. Asses' milk and goats' milk approximate much more closely to human milk than cows' milk in composition, inasmuch as they contain less casein and yield a more flocculent digestible curd.

In addition to the sterilizing process, milk is sometimes preserved in a dessicated form—the water being driven off by evaporation; or it can be obtained in a highly concentrated form as "condensed milk." What is called "koumiss" is a fermented drink prepared from mare's milk, and has long been used in Russia and Tartary, but "koumiss" is now largely made in this country from cow's milk and constitutes a valuable food for invalids because it is easily digested and readily absorbed.

In most cases of falsification or adulteration, milk is watered or skimmed (or "separated"), or both watered and skimmed, and what is sold as new milk is often largely mixed with skimmed milk. Watering is detected by a lowering of the specific gravity, and a diminished percentage of cream; but when creaming alone is resorted to, the specific gravity is raised and the percentage of cream diminished. When both are resorted to, the specific gravity may be normal, but the percentage of cream is of course always lessened. When milk has been falsified in this way, other substances, such as treacle, turmeric, carbonate of soda, etc., have sometimes been added to improve the flavor and appearance; but such sophistications are now very rare. Generally speaking, the use of the lactometer to determine the percentage of cream, and test the specific gravity, will enable one to give a reliable opinion as to whether the milk has been tampered with or not. Suspicious samples should be sent to the public analyst for analysis.

In order to prevent fermentative changes when milk is conveyed long distances from country farms, it has recently become a somewhat common practice to add a little salicylic acid, boracic acid, or boryglyceride to the milk, and these adulterants constitute another possible danger.

All milk from diseased animals should be condemned. The normal constituents of milk as seen under the microscope consist of round oil globules, enveloped in a cyst, and scattered epithelial cells; but in milk obtained from diseased animals, blood, pus cells, and aggregated granules may often be detected, and sometimes casts of the lacteal tubes, while bacteria and small oval and round cells are not at all uncommon.

Disease in the cow often arrests, and almost always diminishes, the flow of milk, except it be in cases of tuberculosis, when it becomes watery and poor in quality. Indeed, a marked diminution in the flow of milk from any cow should at once arouse suspicion, and the milk for the time being should be excluded from the common stock.

But apart from cow conditions affecting milk, which will be discussed more fully in the following section, milk often becomes unwholesome by keeping, especially in warm weather. The sugar is converted into lactic acid by microbic fermentation, and becomes markedly sour; the milk curdles, the whey separating from the curds, and finally putrefactive changes are set up.

11. **Butter.**—Butter should have no unpleasant or rancid taste. Adulteration with water or animal fats is best detected by melting the butter in a test-tube; the water, salt, or other substances remain at the bottom. After separation of the casein by melting, good butter is entirely soluble in ether at 65° F., while the fat of beef or mutton dissolves with great difficulty, and leaves a deposit. Adulteration with potato or other starch can be at once detected by iodine, which turns the starch blue. Good butter, when melted in a tall glass, should yield over 80 per cent of fat, the water and curds collecting at the bottom, leaving the pure fat as a clear-looking oil above. Adulteration with lard or other animal fats raises the melting point, while vegetable fats lower it. The butter made in dairies in which scrupulous cleanliness of premises and utensils is not maintained, or from milk obtained from cows tied up in foul cowsheds, is apt to become rancid, and is often badly flavored.

12. **Margarine, Oleomargarine, or Butterine**, which is sometimes sold as butter, is composed chiefly of fats of animal origin, and is treated with milk and genuine butter to make it resemble butter as closely as possible.

13. **Cheese.**—The quality of cheese is determined by the taste and consistence. Inferior cheeses are often soft and leathery, owing to the amount of water which they contain. Starch, which is sometimes added to increase the weight, may be detected by iodine. Cheese

consists of casein coagulated by rennet, and it also contains a variable proportion of fat and salts. When it undergoes what is called the "ripening" process, oxygen is absorbed, ammonia and carbonic acid are given off, and the casein undergoes fatty changes. Cheese fermentation sometimes develops an irritant poison, known as **tyrotoxicon**, which causes dryness of the mouth, nausea, vomiting, diarrhea, and extreme prostration. The same poisonous substance is sometimes developed by butter and cream.

14. **Eggs.**—An average sized egg weighs about 2 ounces avoirdupois. Fresh eggs, when looked through, are more transparent at the center; stale ones, at the top. In a solution of 1 of salt to 10 of water, good eggs sink, while the stale ones float. Eggs held up to the flame of a candle or to sunlight are translucent if fresh. Fresh eggs have a pink inside the shell, and do not cook hard as easily as stale ones. Stale eggs have smooth, shiny shells, but fresh eggs are dull on the surface.

15. **Tea.**—The quality of the various kinds of tea imported into this country has greatly improved of late years. Any attempts at adulteration are best detected by shaking the leaves in cold water, straining through muslin, and afterwards examining the leaves and deposit. Inferior mixtures, such as Maloe mixture, Moning congou, Pekoe siftings, etc., consist of exhausted tea-leaves, leaves of other plants, iron-filings, etc., with only a little good tea.

Good tea should yield a pleasant aroma, alike in the dry state and when infused in boiling water, and the flavor of the infusion should be agreeable. The test for tea of the first quality is to put a small quantity in a cup, pour water at the boiling point on it, taste it for its flavor, then allow it to stand until it cools, when it should throw up what is called a cream. The leaves, when spread out, should be small, serrated, elongated, and liver-colored.

16. **Coffee.**—The principal adulteration of coffee is chicory. The adulteration may be detected either by microscopic examination or by sprinkling a portion of the suspected sample on the surface of water, when the coffee will float and the chicory sink. The presence of chicory is also indicated if, on opening a packet of coffee, the contents are found to be caked, or show any signs of caking.

Amongst other articles of food or drink which are liable to adulteration may be mentioned cocoa, mustard, pepper, confections, beer, wine and spirits. Any article of food or drink, or any drug which is supposed to be adulterated, should be submitted to a public analyst, on whose report proceedings may be taken.

Unwholesome Food.—Although much of the apparent immunity from disease enjoyed by the large numbers who unwittingly indulge in unwholesome food at times is to be attributed to the antiseptic power of good cooking, there are also many instances on record in which food of the most putrid description is devoured without producing any ill effects. Thus there are whole tribes of savages who eat with impunity rancid oil, putrid blubber, and stinking offal; and game is not considered to be in a fit state for the epicure's table until it is undergoing rapid putrefactive change. Admitting all this, however, there is abundant evidence to prove that serious consequences resulting from the use of unsound meat are of frequent occurrence, and in all probability a large proportion of cases of obscure disease owe their origin to the same cause.

(1) **Diseased Meat.**—In the numerous cases of illness which have been attributed to the use of diseased meat, the symptoms are very similar to those occasioned by the use of putrid meat, and are chiefly confined to the alimentary tract. The exceptional symptoms apply chiefly to the transmission of specific or parasitic disease. Thus numerous instances have been recorded in which persons have been seized with malignant pustule after eating the meat of animals suffering from anthrax, and there is an increasing amount of evidence which goes to prove that tuberculosis may be transmitted to man through eating the flesh of animals suffering from this disease. As regards the development of parasitic disease, reference has already been made in the previous section to the fact that the parasite *Cysticercus cellulosus* in measly pork produces in man the tapeworm, *Tæia solium*, and that of the ox or cow the tapeworm *Tænia medio-canellata*. The trichina disease, again, which was so prevalent in Germany and elsewhere a few years ago, is due to the *Trichina spiralis* in the pig; while the *ecchinococcus* disease, so common in Iceland, owes its origin to the flesh of sheep and cattle which have become invested by the *tænia*, or tapeworm of the dog. It appears that all these parasites are destroyed if the meat is thoroughly cooked before eating.

(2) **Putrid Meat.**—When putrefactive change sets in, whether in butcher-meat, fish, fowl, or any other kinds of animal food, certain alkaline substances known as *ptomaines*, are produced, which are highly poisonous. These poisons are manufactured by the microbes of decomposition, and may continue active after the microbes themselves have been destroyed. Meat which has become tainted by putrefactive microbes may possibly be cooked sufficiently to destroy the microbes themselves, while the poisons they have formed continue to

decompose the meat, and give rise to poisonous substances. Thus a cold beefsteak pie, or other meat, may become poisonous and produce serious symptoms, although the same food may have been eaten with impunity immediately after being cooled, for during the process of slowly cooling, poisons may have been formed in the meat. There are strong reasons for believing that the poisoning properties are greatly intensified when they are produced by the combined action of ordinary putrefactive bacilli and the microbes present in the tissues of diseased animals.

In some cases poisonous properties are imparted to tinned meats by the action of their juices on the metal. The envelopes of sausages, saveloys, etc., may in themselves be injurious.

Numerous outbreaks of food-poisoning have been recorded, and the fact that in all of them the onset of the attacks are so very sudden after partaking of the implicated food, points to the conclusion that the symptoms are produced not by the putrefactive bacteria or bacilli found in the food, but rather by the ptomaines or other poisons developed by their action.

The symptoms induced by food-poisoning are chiefly confined to the gastro-intestinal tract, such as vomiting, cramps in the stomach, and diarrhea, sometimes cholera-like in character. In severe cases the prostration is great, and occasionally a rash appears on the skin.

Reference should here be made to the numerous outbreaks of enteric, or typhoid, fever which have recently been traced to the consumption of sewage-contaminated oysters, and it is highly probable that other shell-fish which feed on sewage-polluted beds contribute materially in spreading the disease. The extremely foul conditions under which edible molluscs are fed and fattened are fully known to those who have studied this question.

Unwholesome Vegetable Food.—All articles which have become moldy or partially decomposed are dangerous. Vegetables and fruits coming under this category should be condemned. Flour which has a strong, musty flavor should be condemned, and if dark in color it should be examined microscopically.

MILK IN ITS RELATION TO DISEASE.

In 71 outbreaks of diseases due to the agency of milk, there were 50 of enteric (typhoid) fever, 14 of scarlatina (scarlet fever), and 7 of diphtheria. The number of cases traceable to each of these diseases in the various outbreaks was estimated at 3,500, 800, and 500, respectively. As regards enteric fever, the contamination of the milk was,

in 22 out of the 50 outbreaks, traced to the use of specifically polluted water for "washing the milk-cans," and no doubt in all of them the water was the prime agent in producing the disease. In the majority of outbreaks of scarlatina, however, it was found that persons employed in the dairy were in attendance on patients suffering from the disease, or that the disease itself had attacked those employed in the dairy. A diseased condition of the cow herself is often the direct cause of the infective quality of her milk. Biological tests prove that in respect to scarlatina and diphtheria there is direct casual relationship between sickness of the cow and of the human subject.

It will be of advantage to consider very briefly the particular characteristics of milk which qualify it in such an exceptional degree as an agency in the spread of disease. In the first place it has to be noted that **milk is highly absorbent**, and therefore becomes readily tainted with any gases or vapors, whether organic or inorganic, or any noxious effluvia to which it may be exposed, such as the foul smells from manure-heaps or drains, or the foul, close air of a dirty dairy or pantry. It then presents the taste and smell of the absorbed impurity, rapidly decomposes, and has often been the cause of gastric irritation, vomiting, and diarrhea.

But as an absorbent it also becomes readily impregnated with any **filth from the hands** of dirty milkers, from dirty teats, or from imperfectly cleansed vessels in which it may be conveyed or stored. Further, lead, copper, and zinc may be absorbed by milk from the vessels in which it is allowed to stand. Enameled earthenware which contains lead carbonate is objectionable, because it can be attacked by milk which has become sour. Tin, or tinned iron, is preferable, but enameled iron pans are safer still.

Filth-tainted milk rapidly decomposes, and if the fungus **oidium albicans** is present it may induce thrush in infants, while other fungi, such as penicillium, aspergillus, etc., may cause gastric irritation. This tainting of the milk is notoriously the cause of infantile diarrhea during warm weather owing to negligence in keeping feeding-bottles clean, and it is highly probable that this intestinal irritation is largely due to the formation of a poison (tyrotoxin) by decomposition of the milk in the gastro-intestinal tract.

In the second place, as milk is a liquid which contains all the essential constituents of food, it **forms a good medium for the cultivation of bacteria**, and therefore disease germs which have gained access to the milk may in a very short time multiply to such an extent as to greatly increase its power of infectivity. Many of the

recorded outbreaks, more especially of scarlatina and enteric fever, support this view.

In addition to those ways already alluded to, milk may also become infected with the germs of animal disease—as from the mouth discharge of a neighboring cow suffering from foot-and-mouth disease, or, as has occasionally happened, from the nasal discharge of a horse suffering from strangles, put up in the same outhouse.

In respect to milk as a secretion, it is evident that it must always in some degree reflect the health of the animal for the time being. In the Western States of America the milk of cows affected with “the trembles” from eating the leaves of the *rhhus toxicodendron*, or poison oak, has frequently been known to produce severe gastric symptoms among children, accompanied by great weakness and lowering of the temperature, and sometimes proving fatal. **Swill milk**, as it is called, or milk obtained from cows fed on distillery swill, is regarded as such an unwholesome food for children that its sale is prohibited by law. It is hardly necessary to point out the risk of using milk from a cow being given medicine, because, apart from the diseased condition of the cow, it is well known that all soluble salts may appear in the milk.

Although it may be quite true that the milk of diseased cows is often used without producing any appreciable ill effects, there is always a great element of danger, and on that account it cannot be too strongly insisted on that milk yielded by a cow suffering from any form of disease, and especially from a diseased condition of the udder and teats, should never be used for food. Whether the disease be constitutional or local—a mere rise of temperature, or some casting of the hair or cuticle, a chapped teat, or some pustular or vesicular eruption—the only safe rule to follow is to exclude the milk from the common stock. It should be thrown away or well boiled before being given to pigs or other animals.

The milk of cows suffering from **foot-and-mouth disease** sometimes produces ulceration of the mouth and gums, with swelling of the tongue and great fetor of the breath, and several outbreaks of this kind have been recorded. In **anthrax** and **anthracoid diseases**, the specific bacilli have been found in the milk, while the milk itself is of a bad color, contains pus or blood cells, and rapidly decomposes.

In respect to **tuberculosis**, it is notorious that stall-fed cows suffer in large numbers from this disease, and some of them have tuberculous nodules in the udders, which often suppurate. In tuberculosis, nutrition is not much interfered with until the disease reaches an advanced stage, and even then the amount of milk yielded, though

poor in quality, is so plentiful that the dairyman keeps the animal, and mixes the milk in the general stock.

The dangers in milk obtained from cows suffering from this disease, apart altogether from any implication of the teats or udders, are based on the fact that the bacilli of bovine tuberculosis are so like those found in the human organs, although the disease presents different anatomical conditions in man and cattle.

According to the experiments, milk which is found to contain tuberculosis bacilli reproduces the disease, and this also applies to cream, butter, and whey.

It is also well known that pigs fed on dairy refuse are sometimes infected with tuberculosis.

Milk from cows affected with tuberculosis **in any part of the body** may contain the virus of the disease. The virus is present **whether there is disease of the udder or not**. There is no ground for the assertion that there must be a disease of the udder before the milk can contain the infection of tuberculosis. On the contrary, the bacilli of tuberculosis are present and active, in a very large proportion of cases, in the milk of cows affected with tuberculosis, but with no discoverable lesions of the udder.

To all this the objection has been raised that if all tuberculous cattle yielded tuberculous milk the disease would be far more common amongst human beings than it really is; but the experiments of Koch and others on anthrax and cholera bacilli, when ingested, show that it is only when the intestinal functions (digestion) are disordered, and when, in consequence, there are alterations in the structure and in the chemical constituents of the fluids of the alimentary canal, that tubercular bacilli can penetrate through the epithelial layer. In other words, persons in health and with sound digestion are not apt to be infected by using milk from tuberculous cows.

According to Lehmann and other German authorities, **mixed milk**, as usually purchased, is generally harmless so far as the spread of tuberculosis is concerned.

Milk from newly calved cows, even when it is mixed with large quantities of milk obtained from healthy cows, is dangerous.

1. **Scarlatina**.—Cows are liable to a disease identical with, or very closely resembling, human scarlatina. The disease in man and in the cow alike is characterized by closely similar anatomical features. From the diseased tissues and organs of man and cow alike the same germ can be obtained and artificial cultures be made from it.

Calves fed on cultures established from human scarlatina get the

disease, and children fed on milk from cows suffering with the disease develop scarlatina.

2. **Diphtheria.**—An inflammatory condition of the udder, known as **garget**, has been suspected of causing diphtheria in those using the milk. Although this view has not been clearly established, there are several outbreaks recorded in which morbid conditions of teats or udders have been believed to be the cause.

Whether these milk-borne outbreaks be regarded as scarlatinal, diphtheritic, or septicæmic, as seems probable, there can be no question that the disease in the cow causes human infectious disease.

3. **Typhoid or Enteric Fever.**—Out of fifty milk-borne outbreaks of enteric fever recorded, about one-half were traced to specifically polluted water, and probably in all of them polluted water used either for rinsing the milk-cans or diluting the milk was the prime agent in producing the disease.

In a very few exceptional instances the disease was believed to have originated by the drinking of polluted water by the cows themselves, and it has also been maintained that enteric symptoms in the cow may induce enteric fever in consumers of her milk, but so far the evidence in support of these views does not appear to be conclusive. Nor is there any evidence to show that the milk or butter of cows fed on sewage grass, as was at one time feared, has produced typhoid fever or other ill-effects; on the contrary, numerous analyses have proved that the milk and butter obtained from cows so fed are of excellent quality and keep well.

The special characteristics of milk epidemics, and particularly those of scarlatinal or throat types, are—the usually sudden outbreak and its almost equally sudden ending, when due allowance is made for late cases in infected households; the large proportion of attacks which are simultaneous, or nearly so; and the very large proportion of households attacked which will be found to have a common milk supply, though the milk may not be distributed by the same retailer. It will also be found that if the households are classified according to the amount of milk supplied by the suspected dairy, the cases will be proportionately more numerous in those using larger quantities; and hence the occurrence of the disease generally falls on households of the better class. This also applies to individuals, and therefore the attacks are more numerous among children and women than among men. In respect to outbreaks of enteric fever, this would be specially significant, because under ordinary conditions the disease chiefly affects adults.

When an outbreak which is suspected to have a milk origin occurs in any locality, and the exact source of infection has not been traced, it is always advisable to boil the milk. So soon, however, as suspicion falls on any dairy, the employees, cows, premises, water supply, etc., should be carefully examined, and if the health officer has reason to believe that the milk supply is implicated, it should forthwith be prohibited until the source of infection is removed or other sufficient precautions are taken.

The effects of milk preservatives on health, such as boric acid, formaldehyde, or salicylic acid, are undoubtedly very detrimental. If milk is properly cooled or sterilized, and vessels kept properly clean, such practices are entirely unnecessary, always undesirable, unjustifiable, and now generally illegal.

A committee of prominent physicians and veterinarians recently made the following recommendations to the health authorities of Philadelphia. They are here quoted to show what should be done to put meat-inspection on a proper basis:

"First: All meat inspected by the meat-inspector should be stamped.

"Second: The hours for slaughtering should be regulated, and butchers should be prohibited from killing animals at times other than those fixed.

"Third: All slaughter-houses should be visited by the meat-inspectors during the hours of slaughtering, and **all** the carcasses should be examined, and those found to be in a condition suitable for food should be stamped.

"Fourth: Beef prepared in the surrounding country and brought into the city in wagons should be brought in only at certain specified times, and before unloading the wagon should pass a certain inspection-point where the meat could be examined by an inspector stationed for this purpose, and stamped if found to be in sound condition.

"Fifth: The meat-inspection force should be increased by the addition of a sufficient number of veterinarians.

"Sixth: Sanitary regulations should be established governing certain features of the construction, fittings, and care of slaughter-houses, and every slaughter-house falling below a reasonable standard should be proceeded against as a nuisance."

This committee also thinks that there should be fewer slaughter-houses and more inspectors. In Paris there are 70 inspectors and only 2 abattoirs (slaughter-houses). In Berlin there are 150 inspectors

and only 1 abattoir. In Philadelphia there are more than 100 slaughter-houses and but 5 inspectors!

The inspection of milk as carried on in most municipalities fails to accomplish all that ought to be done in this direction. Municipal milk-inspectors should have the authority to extend their supervision of the milk-supply beyond the limits of their municipality. Systematic, thorough and frequent inspection of dairies and milk-shops will accomplish a great deal. The licensing of milk-dealers has served a useful purpose in excluding some who were not fit to be dealers and in making others more careful. The proper care of milk in the household is often neglected. Milk should be purchased in sterilized bottles and should be removed from these only when it is to be used. Or it may be set into a pail of cold water and then, after it is thoroughly cool, set it by the ice or renew the cold water in which it sits. Milk should be placed on ice (better **beside** or below the ice) as soon as delivered. This prevents the too rapid development of bacteria in it.

The suggestions of a recent Medical Milk Commission appointed by the Director of Public Health of Philadelphia give a good idea of how milk should be handled by dealers. They are as follows:

"1. That all milk-sellers be required to obtain a license, and that such license be granted free of charge.

"2. That no license be issued unless the dealer is willing to state the source of his supply, and to give satisfactory evidence that the producer from whom he receives his milk maintains his herd and premises up to the standard prescribed by the Department of Public Health; observance of such standard to be determined by periodic inspections under the direction of this same department.

"3. That the standard to be established should correspond closely or exactly to the list of fifty dairy rules recommended by the Bureau of Animal Industry of the United States Department of Agriculture.

"4. That dealers be required to remove all milk from the transportation trains immediately upon their arrival, unless in refrigerator cars, and to deliver the milk of the morning and previous evening on the day of its arrival, unless kept iced.

"5. That dealers be required to have a special milk-room so situated in relation to their houses as not to be a thoroughfare. That its walls shall be tiled or painted with a glazed paint; that its floors be made of hard wood, cement, or other composition, or that they shall be covered with linoleum; that the room shall be well ventilated and kept thoroughly clean.

"6. That it be required that all milk-wagons be thoroughly

cleansed after each delivery, and that they be so constructed that thorough cleansing is possible. That all utensils, such as dippers, etc., carried on milk-wagons, when not in use, be kept in separate clean cans.

"7. That no dealer or producer be permitted to deliver milk in bottles who has not on his premises satisfactory appliances for the proper cleansing and sterilization of bottles or who does not properly use them.

"8. That no dealer be permitted to fill bottles outside of his own milk-room. That dealers should be required thoroughly to cleanse and scald all milk-cans before returning them to the producer."

In conclusion, the Commission says:

"In addition to the tests which are at present applied by the Inspectors of Milk we would suggest that, in order to obtain some idea of the bacterial contents of the milk, the degree of acidity of the milk be determined and that all milk showing an acidity of more than 0.2 per cent. be condemned. That an examination by sedimentation be made to determine the amount of dirt per cent., and if found in more than a minimum quantity, that such milk be condemned.

"Any dairyman or dealer who is incapable of meeting such requirements should not be permitted to produce or sell milk. While we realize that a more rigid standard would be desirable from the standpoint of the public health, we recognize the impracticability of attempting to establish such standard at the present time. We deem it advisable to approach the higher standard by gradual stages, insisting upon a strict enforcement of the moderate suggestions recommended."

Milk sold in cities often has formalin (or formaldehyde) put in it to prevent its spoiling. This also unfortunately renders it absolutely unfit for food and dangerous. If formaldehyde is present in milk it turns violet when 4 parts of concentrated sulphuric acid and a little iron sulphate are added to 1 part of water mixed with 1 part of the suspected milk.

Impure Water Supply

Absolutely Pure Water Necessary to Health

Warning as to Water Supply for Drinking and Cooking.

Sources of Supply.

Sources—All supplies of fresh water are derived from the condensation of the aqueous vapor contained in the atmosphere. Whether this falls to the earth in the form of rain or snow, a certain portion of it **runs off** the surface and gravitates towards the sea; another portion **sinks into the soil**, and, passing through strata (layers of the earth's crust) which are more or less porous, or through fissures in rocks, again reappears in springs and wells; a third portion is **evaporated** where it falls; and the remainder becomes **absorbed in the chemical composition of minerals**, or is **utilised in the processes of growth and decay** of animal and vegetable life.

The only absolutely pure water is that properly distilled, or a great deal of that just evaporated into the air from the earth's surface. This water has nothing else in it of a chemical or a living nature, but hydrogen and oxygen chemically combined in the proportion of H_2O . It acquires from the air various gases and living organisms there contained. Rain water really practically never comes to us absolutely pure, H_2O . If there be much dust in the air, and this dust contains noxious chemicals and germs, rain water might be a very bad water, but this seldom occurs. The source of pollution of rain water is usually the earth's surface, its vegetation, or its animals.

Water, and pure water especially, is a great solvent. It will even take up from glass. Hard water is our best example of this solvent property. Here carbonates and sulphates of lime and magnesia especially are taken up from the earth.

Water that goes through the surface and then through the deeper layers has its organic dissolvings decomposed as it goes down, so that artesian well waters usually contain very little, if any, organic materials. This is not always true, though, for water sometimes gets into the deeper strata of the earth through fissures, where practically no chemical transformations take place, so that often artesian well waters show badly from the chemical standpoint. Surface waters, those that have not gone through any great thickness of earth, contain more organic matter than those "artesian" waters, and those that

merely run off the surface contain the most organic matter and in the least altered condition.

The organic matter is that derived from plants and animals, and, of course, this is found in all stages of decomposition in the process of its return to its original elements. The least decomposed is on the surface, the farthest advanced in decomposition is deepest down, and between these two points in a general way all the intermediate stages are met with.

A river water is generally a surface water, and usually contains the most organic matter. All rivers do not drain the same kind of areas, so will vary in their organic content.

Lake waters are fed from rivers, but have had time to undergo many changes, especially in the larger lakes. This water, usually thin, contains less organic material than river waters.

Ordinary well waters, it can be easily seen, will vary much in their composition in different localities and with their depths. Then, even the artesian water will vary also. These all vary then in composition, and yet we have examples of all of these, unquestionably pure waters and perfectly safe as drinking waters. Now, what standard of chemical purity could one give for all these? Many attempts have been made to find a standard. None has yet been found. Every water has its own standard, as every individual in each of his functions has more or less a standard for himself, and yet some are best and some are worst and still pass.

The rainfall which flows on the surface collects in streams, lakes and rivers, according to the conformation of the ground, while the water flowing under ground oozes to the surface either imperceptibly or in springs, and eventually unites with the surface water in its accumulation in lakes, or in its onward progress towards the sea.

The immediate sources of water-supply may therefore be classified as **rain-water**, and water from **springs, wells, rivers, or lakes**.

1. **Rain-Water.**—Rain-water is highly aerated, and, when uncontaminated by the receiving surface or by air impurities, is healthy and pleasant. But frequently it contains a large amount of organic matter, and is therefore often far less pure than water derived from deep wells and springs, especially near large cities, where the air receives vast quantities of excremental dust and effluvia, of smoke particles, and the products of animal and vegetable decay. It is therefore seldom stored on premises except for washing purposes; but in many Continental localities it is collected in underground reservoirs, and constitutes almost the sole source of fresh-water supply to the inhabit-

ants. It is usually collected from the roofs of houses, and occasionally from paved or cemented ground.

2. **Water from Wells, Springs, Rivers, and Lakes.**—The quality and composition of the water derived from these sources depend on the nature of the soil through which it has passed, or on the character of its surface bed or channel. The rain, already charged with carbonic acid in its passage through the lower regions of the atmosphere, becomes still more largely impregnated with this gas when it sinks beneath the surface. In some rich soils, the amount present in the air contained within their interstices, according to Boussingault, is 250 times greater than the ordinary atmospheric ratio. Aided by the action of the carbonic acid which it has thus absorbed, the rain-water dissolves and decomposes various chemical compounds which it meets with in its underground progress, and often becomes so highly charged with them as to become unfit for ordinary use, as in the case of mineral waters.

(1) **Surface or Shallow-Well Waters**, though sometimes comparatively pure, frequently contain a large amount of organic matter. In mossy moorland districts, for example, or in rich vegetable soils, the water may contain from 12 to 30 grains of vegetable matter per gallon, which imparts to it a yellowish or brownish tint; while in marshy districts the amount of organic matter varies from 10 to 100 grains. The saline constituents depend very much upon the geological character of the stratum in or upon which the well is sunk, but in inhabited places these are often masked by the products of excremental pollution. Shallow well waters are drawn from wells not more than 50 feet deep, and seldom exceeding half that depth. Surface waters from cultivated land are always more or less contaminated with manurial impurities, and should therefore be regarded as extremely suspicious waters.

(2) The water from **deep wells and springs** varies according to the geological strata through which it passes. Thus, waters that have passed through soil deposited from water are more or less impure, containing a large amount of salts (20 to 120 grains per gallon), and often much organic matter; while the chalk waters are clear, wholesome, and sparkling, holding in solution a considerable amount of calcium carbonate besides other salts, and being largely impregnated with carbonic acid. Also wholesome and agreeable to the taste, but not so suitable for cooking purposes, is the water from the limestone and magnesium limestone strata. It contains more

calcium and magnesium sulphate than the chalk water, and consequently does not become so soft on boiling. Waters from the granitic, metamorphic, trap-rock, and clay-slate formations are generally very pure, and contain but small quantities of solids, consisting chiefly of sodium carbonate and chloride, with a little lime and magnesia. Waters from the millstone grit and hard oolite are also very pure. The saline constituents are by no means excessive, and are chiefly in the form of calcium and magnesium sulphate and carbonate, with traces of iron. Soft sand-rock waters, loose sand and gravel waters, and waters from the lias clays, vary very much in quality and composition, some of them being very pure and others containing large amounts of mineral and organic matters.

(3) **River water** is in most cases softer than spring or well water. It contains a smaller amount of mineral salts, but is often largely impregnated with organic matter on account of the vegetable debris and animal excreta which find their way into it. Its constant movement, however, facilitates the oxidation of organic impurities, and this purifying process is largely aided by the action of mineral and plant-life.

(4) **Lake water**, especially in mountainous districts composed of the older rock formations, is generally very soft, containing little mineral matter; but as it is essentially a stagnant water, and as all lakes receive the washings of the districts in which they are situated, the amount of organic nitrogenous matter is sometimes very considerable. Any excess, however, of peaty matter in solution may be materially lessened by filtering through sand.

As regards the qualities of potable waters founded upon their respective **sources**, the following classifications are of interest:

a. In respect of **wholesomeness, palatability, and general fitness** for drinking and cooking:

Wholesome	1. Spring water.
Suspicious	2. Deep-well water.
Dangerous	3. Upland surface water.
Very palatable.	4. Stored rain-water.
Moderately palatable.	5. Surface water from cultivated land.
Palatable.	6. River water to which sewage gains access.
	7. Shallow-well water.

b. According to **softness**, beginning with the softest:

1. Rain-water.
2. Upland surface water.
3. Surface water from cultivated land.
4. River water.
5. Spring water.
6. Deep-well water.
7. Shallow-well water.

c. In respect to the **influence of geological formation** in rendering water sparkling, colorless, palatable, and wholesome, by percolation (i. e., soaking of the water through the layers of soil or rock), the following water-bearing strata are given as the most efficient:

1. Chalk.
2. Oolite.
3. Greensand.
4. Hastings sand.
5. New red and conglomerate sandstone.

Quantity Necessary for Health and Other Purposes.—A healthy adult requires daily from 70 to 100 oz. of water for the processes of nutrition, about one-third of which is contained in articles of diet, the other two-thirds being supplied in the form of liquids. The amount for cooking has been estimated at from half a gallon to a gallon daily for each person, while the quantity deemed necessary for personal cleanliness, and for washing purposes, will necessarily vary very much according to the habits of the individual.

Advice Regarding Temperature and Moisture of Air

To Produce Warmth and Save Fuel a Water Container Should Be Kept in Each Room.

I. Temperature.—The various points connected with the temperature of the contained air of rooms, such as its equability, sufficiency, etc., are readily ascertained by distributing thermometers throughout the room, and by comparing the outside with the inside temperature. The efficiency of the heating apparatus is, of course, best tested during very cold weather and in the night-time. When open fireplaces are used the temperature should be noted at the remote parts of the room, and if the air is heated **before** entering, it is advisable to take the temperature at the point of delivery into the room, and to ascertain whether it is well diffused or not.

Thermometers are of various kinds, but all of them consist of a long glass tube of very small bore, closed at one end and blown out at the other into a bulb or reservoir, which is filled with mercury or other liquid, usually alcohol colored. The temperature is indicated by the expansion or contraction of this liquid, and is measured by the length of the thread of liquid which extends from the bulb into the tube. The three principal thermometer scales are the **Fahrenheit**, used in this country and America; the **Centigrade**, now generally used on the Continent; and the **Reaumur**, formerly much used in Germany. The freezing-point, or point at which ice melts, is marked on the Fahrenheit scale at 32°, and at 0° in both the centigrade and the Reaumur scales, while the point at which water boils (at 29.905 barometer pressure) is marked at 212° on the Fahrenheit, 100° on the centigrade, and 80° on the Reaumur. The degrees, therefore, into which these scales are respectfully divided between these two points are 180, 100, and 80; and hence the formula of reduction from any one scale to either of the other two is:

$$\frac{F-32}{9} = \frac{C}{5} = \frac{R}{4}$$

That is, to change Fahrenheit to Centigrade, subtract 32 from Fahrenheit temperature, then divide by 9 and multiply by 5. Or, to change Centigrade to Fahrenheit, divide by 5, multiply by 9, and add 32. Using 4 in place of 5 in the preceding will give Reaumur.

In the two last, any degree of temperature below freezing-point is

represented by a **minus** sign, while in the Fahrenheit scale the minus sign is only used for temperatures lower than 32° below freezing-point.

All thermometers used for scientific purposes should be thoroughly tested and be accompanied by a certificate.

2. **Moisture.**—The amount of watery vapor, or the “hygrometricity” of the contained air, may be determined by hygrometers such as Daniell’s and Regnault’s, or by wet-and-dry-bulb thermometers. The latter are the most convenient and reliable, but they should be distributed some two or three hours before the observations are made. Unless the air is saturated with moisture, the temperature of the wet bulb is always below the temperature of the dry, and the number of degrees of difference between them varies according to the amount of watery vapor present. This is generally represented in relative terms. For example, the point of complete saturation being assumed to be 100, any degree of dryness may be stated as a percentage of this, and can be conveniently ascertained by reference to Mr. Glaisher’s tables.

The relative humidity of the air out of doors should also be ascertained at the same time by way of comparison.

When air is heated it can take up much more moisture. It is “drier” than cool air. Hence moisture should always be added to air when it is warmed up. A pan of water, kept replenished, should be placed in the furnace or on every radiator. This will save fuel, make the rooms more comfortable and contribute much to the well being of the occupants, whether people, pots or plants.

In carrying out experiments in ventilation, the hair-hygrometer gives sufficiently accurate results, and possesses a considerable advantage over the dry-and-wet-bulb thermometer in rapidity of indication. See Vol. I, page 194.

In a room well ventilated and warmed the humidity ought to range between 73 and 75 per cent., the temperature should not fall below 60° Fahr., and the carbonic acid should not exceed 0.6 per 1000 volumes.

What Causes Disease

Under What Conditions We Are Subject To It.

HOW DISEASE IS TRANSMITTED.

The physical agents of disease are excessive heat or cold, excess or deficiency of humidity of the air, contusions, wounds, accidents, dust, and winds. Changes in atmospheric pressure, as in airship ascensions or in mountain-climbing, where the air is much rarefied, or in work in deep mines, in caissons, or diving-bells or in submarine operations, where the air pressure is increased, may prove injurious. The danger is in the lessening of the air-pressure. When this is sudden the gases in the blood are set free.

The so-called vital causes of disease are some species of bacteria and vegetable and animal parasites. Bacteria cause disease by virulent poisons which they produce and which are destructive to the blood-cells and tissue-cells. Animal and vegetable parasites cause disease by injuring or destroying the blood-cells and tissue-cells, by irritating the tissues either mechanically or by their products, and in some cases by the obstruction of important tissues and organs.

The chemic causes of disease are the various chemic substances, such as strong acids and alkalies, which destroy or injure the tissues with which they come in contact.

Infectious diseases are transmitted by drinking-water, food, air, soil, wounds, direct and indirect contact, and through the agency of insects. The diseases transmitted by drinking-water and food have their primary seat in the digestive tract. From this they may spread to other parts of the body. The diseases which are transmitted through the air affect the respiratory tract. The eruptive fevers (such as measles, scarlet-fever, smallpox, etc.) are also very probably transmitted through the air. The diseases which are most likely to be transmitted through soil are tetanus and "malignant edema;" the organisms which cause these diseases usually get into the body through punctured wounds, cuts, or abrasion, i. e., a place where the skin has been rubbed off or removed. Many diseases are probably transmitted chiefly by contact, direct or indirect, with a person sick of the disease. Indirect contact takes place through the agency of anything that has been used or handled by the person suffering from the disease, such as clothing, cups, napkins, handkerchiefs, money, books, toys, tools, beds, rooms, etc.

Insects and vermin may transmit disease either directly or indirectly. Examples of diseases transmitted directly to people by insects are malaria, yellow fever, and filariasis (a disease peculiar to tropical countries) through the agency of certain species of mosquitoes, and relapsing fever through the agency of bedbugs. The indirect transmission of disease occurs by insects such as **flies**, **cockroaches**, and **bedbugs**, to which the germs of disease adhere, and which carry these infective agents on their bodies to food or to persons. The influence of **flies** in transmitting disease has been fully appreciated only within a few years. They alight on all kinds of germ-infected filth which sticks to their probosces (or mouths), wings and feet and is subsequently carried to food-materials. In this way disease may be carried considerable distances. Therefore, for these very definite sanitary reasons, flies, as well as mosquitoes, should be excluded from houses by means of window-screens and mosquito-netting. Fleas also should be destroyed or guarded against, as they are probably directly or indirectly instrumental in the transmission of plague and of the "spotted fever" of Idaho and Montana. Their bites also may give entrance to disease—germs which could not otherwise enter the skin. **Rats** are believed to be subject to plague and to carry it from house to house and place to place.

Isolation and Disinfection in Prevention of Disease.—By isolation the infective materials are confined to a small area, viz., the house, room, or immediate vicinity of the patient. Disinfection can then be readily carried out and the infective materials rendered harmless. The discovery of the specific (i. e., special or essential) causes of disease and of the avenues by which they are thrown off from the body has made disinfection a simple and effective means to limit the dissemination of disease.

In diseases of the alimentary tract the infective agents are thrown off from the bowel and the kidneys, and it is to the feces and the urine that the disinfective materials must be applied. In diseases of the respiratory tract, such as influenza, pneumonia, pulmonary tuberculosis, diphtheria, and whooping-cough, and in mumps, the sputum contains the infective agents, and must, therefore, be disinfected. In these diseases the sputum should be collected in sputum-cups containing strong disinfectants (corrosive sublimate 1 in 1000, but not for use in **metal** cups; or carbolic acid 1 in 40). Paper napkins or clean old pieces of cotton or linen, which can be disposed of by burning, may be used instead of sputum-cups. In the eruptive fevers the infective materials are given off principally through the outer layer of the skin that peels off; this must be disinfected.

Individuals vary greatly in regard to **susceptibility** to disease. The degree of susceptibility depends principally upon 1, the **general physical condition** of the individual; 2, upon his **environment**; 3, upon the **virulence** and amount (or dose) of the infective agent, and 4, upon **hereditary influences**. A lowering of the general physical condition, from whatever cause, predisposes to infection. So long as the physical condition of the body is maintained in the normal state, infection does not readily take place. All of us are more or less frequently exposed to different infective agents, which usually fail to gain a foothold in our bodies because of our having normal vital resistance. The mental state seems to exercise a strong influence on the body in regard to susceptibility to disease. People who dread a disease seem prone to take it, while those who are fearless are more apt to escape. **Environment** is important in regard to predisposition to infection. It may induce a lowering of the vitality of the body, as well as by the more frequent and intimate contact with infective materials in places that are overcrowded, such as street-cars, schools, and other public places, and also in crowded tenement houses. Investigations have shown that tuberculosis is most prevalent in houses in which previous cases have occurred. This is due partly to the probably bad sanitary conditions of these houses, as well as to their being loaded with the infection. It is likely also that the same class of people would be apt to follow one another in a house and they might be prone to tuberculosis. **Heredity** plays an important part in the individual susceptibility to disease. The peculiar constitutions which we inherit may predispose to special infections. This is seen in the greater susceptibility to certain diseases. Thus one family is usually more apt to be affected with a certain disease than the members of another. A disease is said to "run in the family." Of course, it must not be forgotten that this is often due to the fact that all the members of a family live under much the same conditions and if one is sick the others are apt to be exposed to the disease. This is no doubt one reason why tuberculosis runs in a family. The influence of heredity is seen more particularly in the occurrence of certain constitutional diseases, although it is believed also to be important in predisposing to diseases like tuberculosis and rheumatism.

Subject Reference

For Guides for Those Approaching Old Age, see pages 637 to 638.

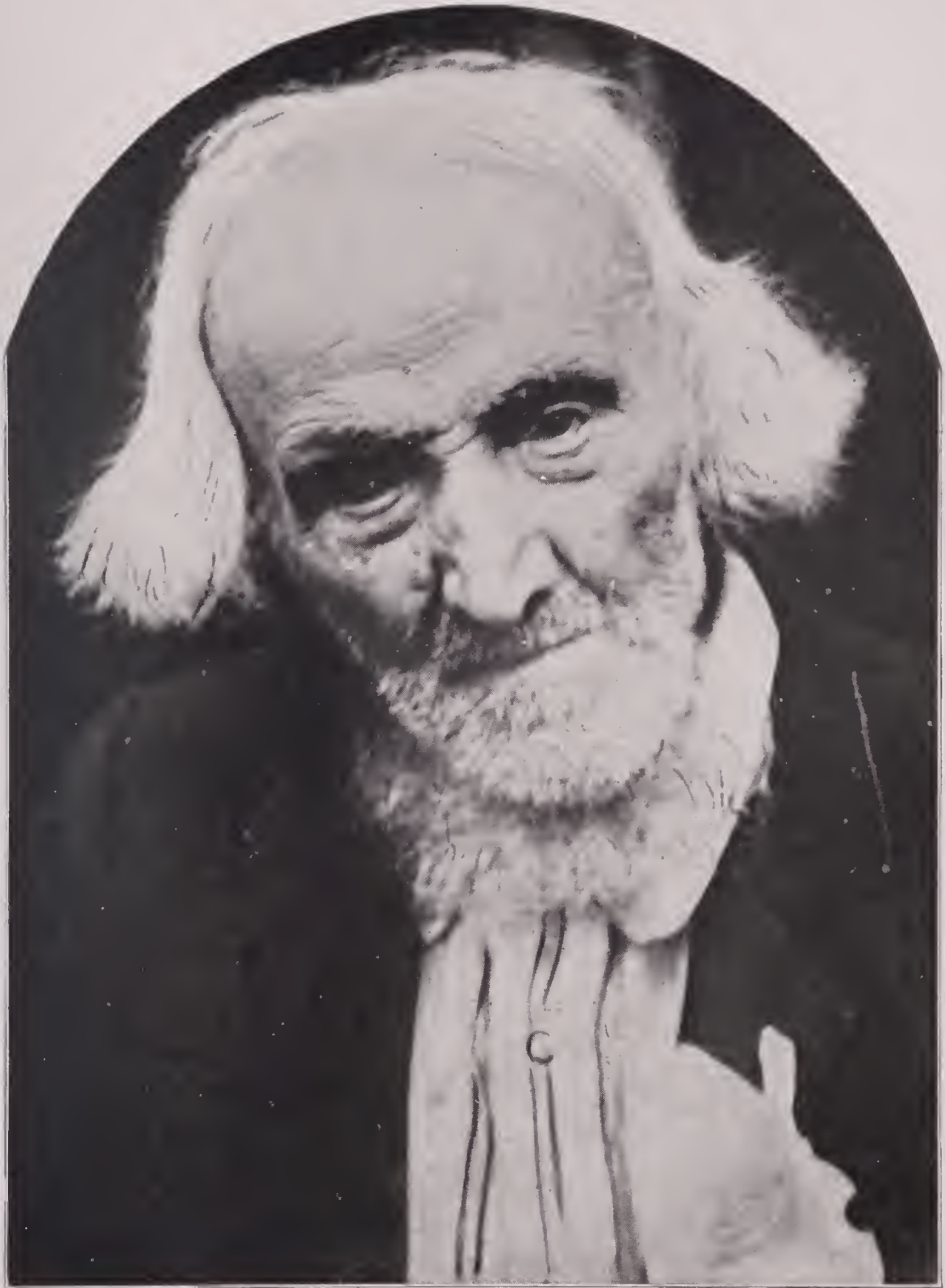
For Foods, for People of Various Ages, see pages 670.

No Reason Why Man Should Not Live One Hundred Years

PROLONGING LIFE.

Age.—Age is the important factor in calculating the effects of disease and death in a population. The object of medicine is to prolong life; that of hygiene, to prevent disease. We are continually hearing of persons who have died after living a century and upwards, and many enthusiasts believe that, were the laws of health rigidly enforced throughout the community, there is no just reason why this term of years should not be reached by many. From the cradle to the grave, however, we are engaged in a perpetual warfare with disease, accident and death, and the prospect of the individual ever becoming a centenarian is infinitesimal. Our best authorities reckon only half a century as a fair prospect for a child born even under favorable circumstances; if we take the mortality tables and divide the total deaths over given periods into four nearly equal classes, we find that one-fourth of the deaths occur in the first year of life; another fourth from the first to the fifteenth year; another is spread over the long interval of forty years (between the fifteenth and the fifty-fifth year), and the remainder take place after the age of fifty-five. Such a calculation, however, gives a very inadequate idea of the causes constantly at work to control longevity.

If we follow a generation through life we will find these causes of mortality graphically illustrated. It may be difficult to assign the true causes of death in infants newly born, and during the first twelve months of their existence, but there can be little doubt that the high mortality is due to the rapid development and fragile condition of all the vital organs, indicating the necessity for care and warmth. Hence, diseases of the nervous system, culminating in convulsions, of the lungs and air tubes, and affections due to unhealthy surroundings, comprise the bulk of the deaths registered at this early period. Young age fares very differently under diverse associations, for although collectively 75 infants in 100 bridge over their first year, yet the proportion as distributed over the various classes of society is far from equal.



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ONE HUNDRED AND THIRTY-TWO YEARS OF AGE

John Shell of Leslie County, Kentucky (born September, 1787), said to be the Oldest Living Human Being when photographed 1919.

In more favored circumstances, such as we might expect among rich people, 87 in 100 survive the first year, and among the nobility 90 in 100. Again, among the poor, crowded together in populous towns, these figures are often reversed, the death rate denoting 50, 60, 70, and 80 per cent; in a street in Liverpool, inspected by Dr. Parkes, it was found that 90 out of 100 children born died before the end of their first year. In the second year pneumonia, bronchitis, and convulsions are still the prevalent and most fatal diseases; many also die of whooping-cough, scarlatina, and diarrhea. Scarlet fever asserts its supremacy in the 2d, 3d, 4th, and 5th years. Whooping-cough is at its maximum in the first year, measles in the 2d, scarlatina in the 3d and 4th years. Thus these diseases take up their attacks on life in succession and follow it onward. Of such as have escaped these maladies, or, when attacked, have surmounted them, and have entered life afresh in their sixth year, a large portion succumb before they have arrived at 15 years, from scarlet and other fevers, to which must be added diphtheria and consumption. Near to and after the age of puberty the prospects of life are more favorable, the diseases most fatal at this time being chiefly consumption and fevers. From the 20th to the 30th year is the period in which consumption gains an ascendancy, nearly one-half of all the deaths from 20 to 25 years being due to this cause alone. Affections of the brain and heart are also not uncommon at this time, and as years advance these diseases become more chronic and intractable, and the probabilities of recovery from accidents and operations begin to lessen.

After 50 years of age the risks to life from fevers, and indeed from all maladies, are greatly increased, and the increase is noticed to continue till the end of life. As old age advances we come to a condition, of the body rather than mind, sometimes termed the "second childhood," in which bodily infirmities become exaggerated by the most trivial causes; sudden changes of temperature, exposure to draughts or irregularities of diet, prostrate their victims. Old age itself becomes a disease, and the body, worn out by active work, succumbs at last, like an eight-day clock or similar piece of mechanism. Though the term "second childhood" is thus often applied to old age, it is, as a rule, more applicable to the body than to the mind, and this is especially the case among persons of both sexes who have spent their lives in active work, both physical and mental. Among our greatest men—politicians, statesmen, judges, divines, and medical men—we have minds as active and vigorous as they were in earlier life, though the bodies which they inhabit are weak and frail.

Subject Reference

*For Preventions
of Venereal Dis-
ease, see pages
237, 240, 243.*

*Prevention of
Diseases of Wo-
men, see pages
267.*

*Prevention of
Typhoid, see page
323.*

Certain Diseases Can Be Prevented

TYPHOID FEVER.

(Quoted from the Bureau of Health, Philadelphia.)

"Typhoid fever is **caused** by a tiny germ that gets into the **body** of the sick person, usually by way of the mouth, lodges and grows and multiplies in the wall of the small bowel especially, and that escapes from the body with the discharges from the body (feces and urine).

"The **discharges** are, therefore, dangerous. They may easily be rendered harmless by scalding them with boiling water or by the use of any of the reliable disinfectants, especially chloride of lime. Such matters should always be disinfected before being thrown away.

"When discharges from typhoid patients are thrown into wells or strewn upon the ground or into sewers, the germs do not die at once, but remain alive for varying lengths of time, and when spread about, may cause an **outbreak** of the disease.

"Persons contract typhoid fever principally by **swallowing germs** that have come from some case of typhoid fever; sometimes the germs are conveyed to the mouth on soiled hands. This is most frequently seen in the cases of careless nurses who are in attendance upon typhoid patients. Sometimes they get into the drinking-water, where they may live for a time, and cause the disease in those using the water.

"Sometimes they get into **milk** by way of water that is used in washing the milk-cans and bottles. When present in milk, they grow and multiply with great rapidity, and a number of serious outbreaks of the disease have been traced to milk in which these germs were growing.

"Now and again **oysters** that are kept in water that is polluted with sewage have also been known, when eaten raw, to cause the disease. It is also possible that typhoid fever is sometimes spread through **other food-stuffs** on which the germs have been deposited by accident, by flies or cockroaches, or through carelessness.

"Fortunately, the germ of typhoid fever is **easily killed by heat.**

If water or milk containing living typhoid germs be **boiled for one minute**, they are rendered free of danger, as such treatment kills all living germs. The cooking of foods robs them of all power to cause typhoid.

"When typhoid fever is present in a neighborhood, much may be done to check its spread by the use only of **boiled water and milk and cooked foods**. After water, milk, and other food-stuffs have been freed from danger by cooking, they are to be protected against being contaminated again by flies, dust or dirt."

Special Precautions against Small-pox.—An instructive circular on the prevention of small-pox epidemics, issued by the Bureau of Health of Philadelphia, is as follows:

"Small-pox is one of the **most contagious** of diseases. It is probably contagious from the beginning to the end of its course.

"The majority of persons who have not been successfully vaccinated or who have not had small-pox are liable to contract it when it is present in the community.

"Of persons who have had the disease or those who have been successfully vaccinated within a period of seven years, only a very small number are ever attacked.

"Before the beneficial effects of vaccination were discovered small-pox was one of the commonest of diseases. Rich and poor, high and low, ignorant and educated, were all affected. In those countries where vaccination is compulsory, small-pox is to-day regarded as a medical curiosity.

"It is a significant fact that of all the cases of small-pox admitted to the Municipal Hospital of Philadelphia only a very small number have been children attending the public schools. The reason for this is that no child is allowed to enter the public schools who has not been vaccinated.

"No one should regard himself as protected from small-pox until a physician has pronounced the vaccination a success. A sore arm or the simple act of vaccination does not necessarily constitute protection.

"When a case of small-pox occurs, it is for the best interest of the patient, the family, and the county, for the patient to be removed at once to the Municipal Hospital for treatment. When for various reasons this is not done, he should be isolated in a room on the upper floor of the dwelling, located as far as possible from those rooms occupied by the rest of the family. The room should be first cleared of all carpets, curtains, hangings, and unnecessary woolen goods. The

furniture should be of the simplest possible description. The simpler the furnishing of the room, the more easily can successful disinfection be accomplished after recovery of the patient.

"When the room occupied by the small-pox patient has been vacated, the Board of Health should be notified. The premises will then be disinfected and all articles of bed and body clothing will be removed to the disinfecting plant, and, after having been rendered free from danger by exposure to steam, will be returned to the owner. This is done without cost to the householder and without injury to the articles.

"Under no circumstances should bed or body clothing or room hangings be taken from the sick-room to other parts of the house or be shaken out of the window until after they have been properly disinfected. By so doing the disease is spread through the house or through the neighborhood.

"When small-pox has occurred in a house and after the sick-room has been disinfected, nothing is more useful in rendering the premises free from danger than a thorough scrubbing of walls, ceilings, floors, and furniture with a hot solution of common washing-soda made by mixing one-half pound of soda in three gallons of boiling water.

"Persons renting houses in sections of the city where small-pox has been conspicuously prevalent would do well to inquire into the health of the family last occupying the premises.

"Employers would do well to insist that all employees present a physician's certificate of successful vaccination.

"All suspicious eruptions upon the skin should be at once submitted to a physician for examination. In case of doubt the Board of Health stands ready to offer the services of physicians skilled in the recognition of small-pox.

"Too much stress cannot be laid upon the desirability of prompt notification in connection with small-pox. On a number of occasions the work of the Board of Health in stopping the spread of the disease has been seriously hampered by failures and delays in carrying out this obligation."

SPECIAL PRECAUTIONS AGAINST CONSUMPTION.

1. Consumption is contracted by taking into the system, chiefly through food and inhalation, the germs or microbes of the disease.

2. This germ is contained in the sputum or spit of the consumptive, and in the minute droplets which he sprays into the air in

coughing or sneezing. The germs may be inhaled directly through the air. Probably they are more often taken in food and are carried by the blood from the intestine to the lung, where they first lodge. When the sputum and droplets become dry they mingle with the dust, and, being inhaled with it, introduce the germs into the body, or the germs may be inhaled directly through the air. Or they may be taken in food, especially in milk and uncooked foods.

3. The consumptive person, therefore, must not expectorate about the house or on the floor of any public building, cab, street car, railway carriage or other conveyance, nor on the street or other public place.

4. The consumptive must not expectorate anywhere except in a spittoon kept for the purpose, which spittoon should contain water, to which a disinfectant has been added, preferably a 5 per cent. solution of carbolic acid, which is prepared by dissolving one ounce of carbolic acid in one imperial pint of hot water. The crude carbolic is as good for this purpose as the much more expensive and purified carbolic acid.

5. When absent from his own room, the consumptive should use a small, wide-mouthed bottle, with a carefully fitting cap (pocket spittoon), the contents of which when emptied should be destroyed and the receptacle carefully cleansed, being kept in boiling water for at least ten minutes. Or he should use a waterproof paper receptacle, to be burned after one day's use.

6. A consumptive should not spit into a handkerchief, but, if not provided with spittoon, should use a piece of cloth or paper, which should be burned at the first opportunity.

7. Handkerchiefs, which may have been used, should be boiled one-half hour before being washed.

8. Consumptives should not swallow their own phlegm, as by so doing the disease may be conveyed to parts of the body not already affected.

9. **Kissing by consumptives should be prohibited.** It is criminal, even though done in ignorance. When coughing, a consumptive patient should always hold a handkerchief in front of the mouth, and should avoid coughing in the direction of another person.

10. The greatest care should be taken to prevent the smearing of hands, face, clothing and bedclothes with the sputa. Should an accident of the kind happen the parts should be immediately cleansed, and for this reason the clothing and wearing apparel of consumptives should be thoroughly disinfected before being used by others.

11. A consumptive should not hold a situation in which he is required to handle the food or wearing apparel of others.

12. A room occupied by a consumptive should not be swept or dusted. Such few floor rugs as are used should be frequently taken up and exposed to the sunlight, and also disinfected at intervals. They should, on no account, be shaken, beaten or swept, except after thorough airing in sunlight. They may then be beaten with a long switch in a strong wind while the beater keeps to windward. In cleaning such rooms wet cloths must be used to wipe the floor, woodwork, windows, furniture, etc., and these cloths should be frequently boiled. These rooms should be thoroughly cleansed at least once a month, in addition to the daily cleaning.

13. When a room is vacated by a consumptive, it should be thoroughly and completely disinfected. The wall paper (if any) should be removed, and the walls, ceiling and floor well washed with a disinfecting solution and well aired.

14. Special sets of spoons, forks, knives, plates, cups, etc., should be kept for the exclusive use of any person affected, and these articles should be placed for a few minutes in boiling water before being washed.

15. Milk and other articles of diet should not be permitted to stand in the bedroom of a consumptive; they should be brought to him in only such quantities as are required for immediate use. Any food that he leaves should be destroyed. Hence it is well to give very little more food at a time than you are sure he will eat then.

GENERAL PRECAUTIONS.

1. The special measures required for destruction of the tubercle bacilli which may have found lodgment in a house are, fortunately, those best for preserving and improving the health of the inmates.

2. These are **air, light, sunshine and dryness**, which, while they aid in rendering individuals better able to resist the lodgment of the germ of the disease, are most destructive to its vitality.

3. **Ventilation** by means of fresh air is most important for the preservation of the health of children, as well as adults, fresh air preventing the development and spread of consumption. Ventilation is essential in factories, workshops, offices and houses, particularly when the air of such places is associated with gaseous fumes and fine dust.

4. The breath from the lungs contains foul organic matter, which

becomes poisonous if rebreathed. Hence the air of living and sleeping rooms, work shops, schools, churches and public vehicles should be quickly changed, otherwise persons breathing it become weakened, and thus become predisposed to consumption.

5. Overcrowding is both dangerous and injurious to health, and should be avoided.

6. Windows should be made to open to the external air, they should be kept open day and night sufficiently to provide for a continuous supply of fresh air, but injurious draughts should be avoided.

7. Open spaces around buildings are necessary for the access of fresh air.

8. Rooms, staircases and passages should be frequently flushed with air by opening windows and doors. This rule applies to churches, school rooms, factories, hotels, public halls, as well as to the homes of consumptives.

9. All rooms should be kept **clean**, otherwise the air can never be pure. Cleanliness and good sanitary surroundings are essential for the prevention as well as the cure of the disease.

10. To protect against the germs of tuberculosis, in both meat and milk, these articles of diet should be subjected to a temperature of at least 180 degrees F. (60 C.). If suspicious the former should be well cooked through, and the latter should be heated to at least 140 degrees F. or sterilized.

11. All bed linen and body linen of a consumptive should be disinfected before being sent to the wash.

12. The clothing, wearing apparel and other effects of a consumptive should either be destroyed or disinfected by superheated steam before being used by another.

13. Never put coins, articles of the toilet or other small objects in your mouth. Do not use a pipe, wind instrument or implement which goes to the mouth, if it has been in use by any other person.

14. The extent to which outdoor exercise and fresh air should be indulged in should be regulated by the physician in charge, as also the character of clothing to be worn and the daily dietary.

Hygiene of a Sick-room.—When an infectious disease appears in the household, the patient should be isolated in a suitable room on the upper floor, removed as far as possible from the other occupants of the house. The upper floor of the house is preferable, because it is less exposed to annoyances by street-noises and street-dust, and is more easily avoided than the lower rooms. It is also more likely to have plenty of fresh air and sunlight, and, if necessary, to be

CAUSE, MODE OF SPREADING AND PREVENTION OF INFECTIOUS DISEASES.

DISEASE.	Carriers of the Infection.	Where it Enters the Body.	The Essential Cause.	Period of Incubation.	Infectious Secretions and Excretions.	Personal Measures to Avoid the Disease.	Preventive Measures to be Applied to the Patient.
Scarlet fever.	Fomites.	Unknown.	Unknown.	Days. 2-7	Desquamation.		Isolation and disinfection.
Measles.	Fomites.	Unknown.	Unknown.	10-16	Desquamation.		Isolation and disinfection.
Chicken-pox.	Fomites.	Unknown.	Unknown.	4-14	Desquamation.		Isolation and disinfection.
Small-pox.	Fomites.	Unknown.	<i>Cytorthyctes variolæ.</i>	8-14	Desquamation.	Vaccination.	Vaccination, isolation and disinfection.
Erysipelas.	Fomites, and direct contact.	Skin.	<i>Streptococcus erysipellatus</i> (<i>Fichtsen's</i>).	2-5	Desquamation.		Isolation and disinfection.
Mumps.	Fomites, and direct contact.	Respiratory tract.	Unknown.	10-15	Sputum.		Isolation and disinfection.
Whooping-cough.	Fomites, and direct contact.	Respiratory tract.	Unknown.	7-14	Sputum.		Isolation and disinfection.
Diphtheria.	Fomites, and direct contact.	Respiratory tract.	<i>Bacillus diphtheriæ.</i> (<i>Klebs-Loeffler's bacillus.</i>)	3-5	Sputum.	Administration of antitoxin.	Antitoxin, isolation and disinfection.
Influenza.	Fomites, and direct contact.	Respiratory tract.	<i>Bacillus Influenzæ.</i>	2-3	Sputum.		Isolation and disinfection.
Pneumonia.	Fomites, and direct contact.	Respiratory tract.	<i>Micrococcus lanceolatus.</i>	1-3	Sputum.		Isolation and disinfection.
Tuberculosis.	Fomites, and direct contact.	Respiratory tract.	<i>Bacillus tuberculosis.</i>	Several weeks or months.	Sputum, feces, urine and pus.		Isolation and disinfection.
Leprosy.	Fomites, and direct contact.	Respiratory tract.	<i>Bacillus lepræ.</i>	Several weeks or months.	Secretions.		Isolation and disinfection.

Plague.	Fomites, and direct contact,	<i>Bacillus pestis.</i>	Days. 3-6	Secretions.	Extinction of rats and fleas, isolation and disinfection.
Cerebrospinal fever.	Fomites, and direct contact.	<i>Micrococcus intracellularis meningitidis.</i>	Unknown.	Secretions.	Isolation and disinfection.
Cholera.	Infected food and water.	<i>Spirillum cholerae.</i>	Days. 2-5	Feces.	Isolation and disinfection.
Typhoid fever.	Infected food and water.	<i>Bacillus typhosus.</i>	12-14	Urine and feces.	Isolation and disinfection.
Dysentery.	Infected food and water.	<i>Ameba dysenteriae.</i>	2-3	Feces.	Isolation and disinfection.
Tetanus.	Infected soil and dust.	<i>Bacillus tetani.</i>	3-30	Secretions.	Isolation and disinfection.
Anthrax.	Infected soil and dust.	<i>Bacillus anthracis.</i>	1-3	Secretions.	Isolation and disinfection.
Glanders.	Infected soil and dust.	<i>Bacillus mallei.</i>	3-4	Secretions.	Isolation and disinfection.
Malignant edema.	Infected soil and dust.	<i>Bacillus edemae maligni.</i>		Secretions.	Isolation and disinfection.
Syphilis.	Contact.	<i>Lustgarteris bacillus.</i>	About three weeks.	Secretions.	Isolation and disinfection.
Gonorrhea.	Contact.	<i>Micrococcus gonorrhoeae.</i>	Days. 3-5	Pus.	Isolation and disinfection.
Typhus fever.	Fomites.	Unknown.	5-14		Isolation and disinfection.
Relapsing fever.	Insects.	<i>Spirillum Obermieri.</i>	8-12		Isolation and disinfection.
Yellow fever.	Mosquitoes.	Unknown.	3-6		Isolation of patient from mosquitoes and destruction of all mosquitoes.
Malaria.	Mosquitoes.	<i>Plasmodium malariae.</i>	6-16		Isolation of patient from mosquitoes and destruction of all mosquitoes.

1. *Fomites* (singular *fomes*) are things that carry or harbor the germs of the disease, such as toys, clothing, books, carpets, etc.
 2. The *desquamation* is the skin flakes or shreds which peel off when the patient is recovering. The desquamation is due to the inflammation of the skin during the presence of the rash, and is usually in proportion to the severity of the rash.

more easily heated. All well persons, except the physician and the nurse, should be rigidly excluded from the room. No occupants of the house should attend any school or other public assembly. A moistened sheet may be suspended in front of the door of the sick-room to arrest most of the infectious dust-particles. The room itself should be very simply furnished, and all unnecessary furniture, carpets and curtains, should be removed. Sweeping should not be allowed in a sick-room. All horizontal surfaces should be wiped off with a damp cloth each day. Clothing, bed-clothing, handkerchiefs, etc., should be placed in a disinfecting solution before they are taken from the room. The sick-room may be conveniently supplied with a gas-stove and a small boiler, in which napkins, eating utensils, etc., may be boiled to disinfect before removal. Any food that is left by the patient should be burned or otherwise treated as infected or dangerous.

After the recovery and removal of the patient, the room should be closed for some hours to let all dust-particles settle. It should next be fumigated or disinfected, and then cleaned in the usual manner with hot washing-soda solution, chloride-of-lime solution, or some of the stronger disinfectants, such as 2 or 3 per cent. carbolic-acid solution in water. All toys and other articles of little value which have been in the room should be removed in a sheet moistened with solution of chloride of lime or carbolic acid, or wrapped in newspapers or paper bags and afterwards burned. Books should always be disinfected before they are used again. This may be done by means of formaldehyde gas or by steam. The books should be stood on end with the leaves spread apart.

House-quarantine is sometimes necessary against a number of infectious diseases, viz., cholera, small-pox, diphtheria, diphtheria croup, membranous croup, scarlet fever, typhoid fever, typhus fever, plague, epidemic cerebro-spinal fever, relapsing fever, and leprosy. The length of time during which quarantine is necessary differs with each disease: in some, the period is fixed arbitrarily; in others, as in diphtheria and diphtheritic croup, quarantine is maintained until cultures from the patient's throat show the absence of the specific bacteria. In the eruptive fevers, as scarlet fever and measles, quarantine is continued until desquamation has ceased. Table C shows the carriers of the infection, the period of incubation, the period of desquamation, the point of entrance of the infectious agent, the excretions which are infective, the cause, the special prophylactic measures, and the preventive measures of the principal infectious diseases.

INSTRUCTION FIFTY-EIGHT—Gymnastics

How to Maintain Vigorous Health and Efficiency by Exercise

How to Keep Supple and Keep the Muscles Flexible

EXERCISES IN THE HOME.

Subject Reference

For Muscles—Description and Illustrations, see Vol. 1, pages 19 to 24.

Physical Training, Effect on Heart and Skin, Vol. 1, pages 171 to 186.

Chest Expansion, Vol. 1, page 209.

Exercises (Increased Breathing) Vol. 1, page 213.

See Vol. 2 for Following: Exercise in Pregnancy, page 252; Exercise in Consumption, page 252; Exercise in Puberty, page 279.

These home exercises will develop agility and suppleness of body and limb. They aim at the good effects of exercise rather than at abnormal muscle-development, at flexibility rather than hardness. The different movements affecting any one part of the body do not directly follow one another. The evil of strain has been kept in mind and avoided. At first the movements should be gone through lightly and always stopped short of actual fatigue. Properly regulated exercise gives a feeling of buoyancy and well-being rather than of fatigue or depression.

During the interval between the exercise periods (when one is at his regular occupation) attention should be given to carrying one's self properly—head erect, shoulders back and down, chest forward, abdomen drawn in a little. Thus all the ordinary movements which one makes each day, such as walking, sitting, stooping, etc., become practical developmental exercises of far more value than any system of daily home gymnastics. Indoor exercise can only supplement but never supplant the healthful outdoor sports, such as walking, golfing, rowing, bowling, tennis, baseball, etc.

Attention to the abdominal muscles (those in the front part of the body, below the ribs) is very important. Any exercise or sport which develops those muscles must also secure good general development. A prominent abdomen is very often due merely to flabbiness of these muscles and not to fat or increased girth.

Walking a distance each day with the abdominal muscles held. Instead of thinking of the muscles themselves it is better to attend to the correctness of one's carriage in walking: head erect, chin

firm will give a rapid and substantial development of their tone and power, i. e., they will become firmer and stronger. Marked reduction of fat of the abdominal girth may be brought about simply by giving attention to the abdominal muscles and keeping them firm while walking. This also quickly lessens prominence of the abdomen. down, shoulders well back and down, chest up and forward, abdomen held in, hips drawn back—use your **muscles** and not your bones when sitting or walking. Use the toes in walking. Carrying a book or other object on the head gives a good carriage.

It is desirable to have a trained medical adviser to select the kind of exercises best adapted to your individual requirements, and to warn you against the dangers of exercise if you have organic disease. The following **general rules** should be carefully followed:

Before beginning these exercises empty the **bladder**, blow the **nose**, and drink a **glass of water**, not too cold.

Unless otherwise stated the **position** in all these exercises is: heels together; toes turned out, so that the feet form half a right angle; chest upward and forward; shoulders held back and down; arms hanging loosely; hips drawn back; abdomen drawn in; head erect, and chin down and in.

The best time for exercising is on rising or before breakfast. At this time the vitality is at its highest; the exercises can also be done with greater regularity.

The **room** should be well ventilated, with the windows down from the top and up from the bottom. It is well to exercise in a room other than the bedroom, but good ventilation makes the latter suitable (and every bedroom should have this).

The **clothing** should be loose-fitting, leaving the movements of the body free. The night-dress answers very well. The feet should be bare or stockinged.

The exercises should be performed before a large mirror. Faults can then be corrected more readily and the work is more interesting. There is somewhat the effect of having a companion also.

Close attention should be given to the work, and each exercise should be performed with precision. Absolute regularity in home gymnastics soon makes them one of the daily habits of life.

Whenever the **arms** are extended in an exercise they should always be stretched out as far as possible.

It is well to **rest a half minute** after each exercise.

Dumb-bells are required only for the second, third and fourth exercises here given, and should not be used in any of the others.

Dumb-bells for male adults should weigh from **one to three pounds each**; for ladies and children, **one-half pound** each is heavy enough.

1 **Stretching Exercise.**—Lock the hands in front; stretch the arms as far out as possible horizontally in front. Without bending the knees, touch the floor. Straighten up the body, carrying the arms upward and backward above the head; then bring the arms down laterally (inclining them backward) to the level of the shoulder; then out in front to starting position. Throughout this exercise extend the arms as far out as they will go. Repeat ten times.

2. **First Dumb-Bell Exercise.**—Place the bells on the shoulders. Carry the right bell out from the shoulder to the right, turn the head to the right. Bring the right bell back to the shoulder, and at the same time extend the left arm and bell, following with the head. Repeat. Do not let the elbows sink below the level of the shoulders, and do not **roll** the head—simply turn it, keeping the chin down. This is good to develop the arms, shoulders, and neck, and to correct an habitually bad carriage of the head. Repeat ten times, and gradually increase to fifty times.

3. **Second Dumb-Bell Exercise.**—Keeping the elbows held close to the sides, alternately touch the thigh and the chest with the palms up. This develops the upper and lower arms. Repeat ten times, and gradually increase to fifty times.

4. **Third Dumb-Bell Exercise.**—In this carry the dumb-bells from the sides back and up to above the head; then down to the shoulders, bending the wrists; then out laterally on a level with the shoulders; then back and down to the side of body. This exercise corrects round-shoulders and contracted chest. Repeat ten times, and gradually increase to thirty times. When the bells are elevated above the head, **leg-exercise** may be added by rising on the toes. As the arms are lowered to the sides, the body should be **raised on the heels**, the toes being raised as high as possible.

5. **Breathing Exercise.**—With the hands on the back of the thighs slowly empty the lungs of as much air as possible. Raise the hands above the head, turn the palms up and the arms back, at the same time taking in a full, slow breath. Lower the arms, turn them backward and slowly exhale. Inspiration should be completed just as the hands come together above the head, and expiration should be completed as the hands reach the sides of the body. At the end of expiration, bring the chest into extreme contraction by crossing the arms in front and bending forward, at the same time making a forced expiration to further empty the lungs. Keep the mouth closed, and

exhale and inhale through the nose. In raising and lowering the arms be sure to turn them backward. This movement, besides increasing the girth and contour of the chest, develops the muscles of respiration and increases the capacity, elasticity, and circulation of the lungs. Leg-exercise may be added in the manner described in the preceding exercise. Repeat ten times.

Occasionally taking a deep breath while walking outside or in front of a raised window, if indoors, is a very useful habit. Indoor workers would be greatly benefited if they would raise the windows occasionally and take several deep breaths.

6. **Twisting Exercise.**—Rest the hands on the hips, thumbs back, fingers to the front. Turn the chest and shoulders as far as you can to the right, then to the left. As each hand comes forward in turning press the fingers deep in, thus kneading the abdomen; do not confine the pressure to any one spot, but go over the whole abdomen. The neck is not to be twisted, nor the face turned to look over the shoulder. This exercise stimulates the action of the intestine, as well as the circulation in the abdomen. It is useful in constipation and torpid liver; it is also good when there is excess of fat on the abdomen. Bringing into play the rotary muscles and the ligaments of the spine, it is an excellent exercise for a weak back. Repeat ten times, and gradually increase to fifty times.

7. **Shoulder Shrugging.**—Raise the shoulders as high as they will go; do not draw in the head; lower the shoulders; bring the shoulders forward and cross the arms at the wrists. Then raise the arms, and when they reach the level of the chin, separate them and carry them backward, making a circle on either side of the body. Excellent for round-shoulders and contracted chest. Repeat fifteen times.

Leg-exercise may also be incorporated in this exercise, as well as in all the breathing exercises.

8. **The Breathing Exercise, No. 5,** should be repeated ten times.

9. **Forward and Backward Bend.**—With the hands on the hips and the thumbs back, bend the body forward to a right angle with the legs; as the muscles of the abdomen relax, firmly knead them, going over the whole abdomen. As the body is bent backward, brace it with the hands on the hips and allow the chin to rest on the chest. On the forward bend raise the chin off the chest to avoid congesting the brain. As it brings into play the erector muscle of the spine, this movement strengthens a weak back. Like No. 6 it is good in constipation, torpid liver, and excess of abdominal fat. Repeat ten times, and increase by two each day to thirty times.

10. **Side Bend.**—Bend the body to the right side and touch the right knee, at the same time bringing the left hand into the left armpit; then reverse and repeat. In bending, keep the body in the vertical plane, avoiding the tendency to bend forward or backward. This strengthens the abdominal muscular walls, and therefore prevents hernia. It also strengthens the back. Repeat twenty times, and increase by two a day to fifty.

11. **The Breathing Exercise, No. 5,** should be repeated ten times.

12. **Wind-Mill Movement.**—The body is bent at right angles to the legs, and kept in this position. Raise the right foot by bending the knee, and at the same time touch the floor (or as nearly as possible) with the right hand and carry the left arm upward and forward above the head. Then lower the right foot and carry the right hand above the head, the left foot and hand meanwhile making the movements described for the right. In changing from one side to the other do not raise the body. This is a fine all-round exercise, especially valuable for constipation, sluggish liver, torpor, weak back, narrow chest, and round or drooping shoulders. Repeat ten times, and increase by two a day to thirty times.

13. **First Floor-Exercise.**—Lie on your back full length on the floor with the hands palm down under the hips. Raise the legs with the knees straight to a position at right angles to the body; return to first position; repeat five times, and gradually increase to fifty. This strengthens the abdominal muscles, prevents hernia, and is useful in constipation and fatty abdomen.

14. **Second Floor-Exercise.**—Same position as in preceding. Bring the knees up on the abdomen; return to starting position, and repeat. Do this ten times; then bring the right and the left knee alternately up fifteen or twenty times. The muscles of the wall of the abdomen are ordinarily very weak, and it is better to start with this exercise until the abdominal muscles are strengthened. Then the other floor-exercise can be done with greater ease. This is useful in constipation and for fat and flabby abdomen.

15. **The Breathing Exercise, No. 5,** should be repeated ten times.

16. **Relaxing the Knee.**—Steady yourself by holding on to a chair. Raise the knee to a level with the hip; then raise the foot till the leg is straight (or as near as possible); lower the foot and repeat. This is good to increase the flexibility of the knee-joint. It may with advantage be performed without using a chair or other means to steady oneself, just balancing instead. Repeat ten times, and gradually increase to thirty times.

17. **Relaxing the Hip.**—Steady the body by holding on to a chair, or, better, balance yourself. Hold the leg straight but relaxed. Swing it backward and forward as far as possible. Do the same with the other leg. This exercise increases the flexibility of the hip-joint. It may be varied by keeping the body erect all the time. Repeat ten times, and increase by two a day to thirty times.

18. **Relaxing Exercises for the Shoulder.**—Hold the arms out at the sides on a level with the shoulders, with the hands closed. Swing them **downward**, and crossing them in front of the body make each hand describe a circle ten times. Then, from the starting position, swing the arms **upward**, making circles in the opposite direction to the preceding ten times. The circles are to be made across the front of the body. Do both of these exercises quickly. This increases the flexibility of the shoulder-joint.

Early Rising.—There can be no question, as a **general rule**, that the habit of early rising is conducive to health; but, like many other similar matters, the general application would, by many, be converted into a universal law; and much fallacy and no little mischief has been done by this mistake. The poets have given their strains, the philosophers their aphorisms, and the hearty centenarian his experience, to eulogize early rising as a sort of elixir of life and preventive of illness and disease. It is a great good, but not a universal one.

It is generally said that all those who have attained great and green old age have been early risers; therefore, say others, early rising is a promoter of health; but, on the other hand, those whose constitutions have carried them through a long life have been able to be early risers. As in many other things, the truth probably lies between the two: there have been good vital powers on the one hand, and good habits, of which early rising is often an indication, on the other. The wrong deduction, however, that early rising is an un-mixed good, has occasioned much erroneous practice; and many a delicate person, either in consequence of the false idea, or badly advised by others, has injured his health materially by perseverance in the practice. This, however, is more common among the young than among the aged, who require less sleep.

There is no question but that the bodily powers and constitution undergo marked and regular changes during the twenty-four hours, changes which are probably influenced by atmospheric and other causes not at present understood. At all events, in disease, evening brings fever if it is present at all, and towards morning excitement

abates, if it does so at all; and persons of weak nervous power generally feel better towards evening than they do in the morning, even when the refreshment of a night's rest might be expected to have given strength. The reason of these differences it is perhaps not possible fully to explain, but we may reasonably conclude that the same influence which causes or aggravates the evening fever, and extracts excitement towards morning, may also act as the elevator or depressor of the constitution generally, although only felt when it is not in full vigor; it may, or may not, be owing to the presence or absence of solar influence, but still it is so, and the fact is one of general experience. The fact, too, explains why early rising is not only not good for all persons, but why to some it is positively hurtful, and why those who are able to practice it are generally of strong and good constitution. Moreover, the fact tells that the person who cannot rise early with immunity is not in full vigor, but requires means for attaining a better state of health: when the powers of life are raised to the proper level, then, by all means, let them be kept to it, and early rising used as one of the preservative means.

What is meant by early rising is, getting up from rest before the sun has exerted some power upon the earth; the exact period to suit the invalid it is impossible to specify; it ought to be matter of experience. As a general rule for a healthy adult, eight hours sleep, or a third part of the twenty-four hours, should be devoted to rest. That is to say, retiring to rest at a reasonable, early hour, such as ten o'clock, the person should rise as early as can be done without feelings of sleepiness, languor, etc., supervening during the day. There are certainly evils consequent upon continuance in bed in the morning, such as perspiration, etc., but they may be greatly obviated by the non-use of feather beds, or too much clothing. They are less, however, than those which result from a nervous system exhausted at a period of the day before it had come into full activity. The same arguments which apply to early rising also do so to exertions, or continuance without food, by weak individuals in the first part of the morning; they can practice neither with impunity. There is no time of the day so pleasant, and the hale and strong can enjoy it to perfection, and gather health in its fresh breezes; and their description will often tempt the unwary invalid to leave his couch and follow the example, and he really does enjoy, for a short time, the novelty; but shortly languor creeps over him; the breakfast, which disappears before the appetite of the strong morning walker, has no charms for his exhausted weaker companion, who pays with a day of listless languor

for this ill-advised attempt. These hints will, it is trusted, not be taken as an encouragement to laziness, but as pointing out a very common error in popular belief and popular practice. The person of weak vital power, who cannot be an early riser, must guard well that he does not mistake inability for sloth, nor encourage the inability by indulging in late hours, which are often to him the most vigorous. Persons who suffer much from debility in the morning, and who have to be up early, ought, as soon as possible, to have some warm refreshment—a cup of warm milk, if it agrees, or tea, coffee or cocoa. In some few cases the addition of a teaspoonful of rum or brandy to milk is undoubtedly useful, particularly where there is tendency to faintness; but it should be taken only on medical advice, and abandoned as soon as possible.

PART EIGHT—*Care of the Sick*

Care and Management of the Sick

INSTRUCTIONS FOR NURSING

The Administration of Food and Medicine

How to Feel the Pulse, Take the Temperature and
Count the Respirations.

Directory of General Information for Those in Charge
of Patient.

Disinfection and Fumigation of the Sick Room.

Subject Reference

For Quick Action in Accidents and Emergencies, such as Hemorrhages, Wounds, Dislocations, Sprains, Moving the Sick, Artificial Respiration in Drowning and Choking, Symptoms and Treatment for Poisoning, Fainting, Shock, Apoplexy, Sun Stroke, Freezing, Burns, Scalds, Frost Bite, see Vol. 1, part 4, pages 404 to 520.

INSTRUCTION FIFTY-NINE—*Nursing*

Training and Duties of the Nurse.

Nurses for the Sick.—In the care of the sick, next to the attendance of the doctor, the services of the nurse come first in order of importance. In private life, this duty was in former times usually delegated to the mother or other members of the family circle, and in severe illnesses, to some respectable woman who made nursing her profession, but who probably had no vocation, and had certainly never received any training for the work.

Professional Training of Nurses.—It is necessary, in order that she may cope with the changing aspects of disease and its momentary requirements, that the nurse should have at least one year's experience of hospital work. The training should be as thorough as possible, and should consist of (1) nursing in medical as well as in surgical disease and accidents; (2) in night as well as in day duty; (3) in the preparation of foods most used by the sick; and (4) it ought to be accompanied with some practical lessons in the Laws of Health, especially such as bear on ventilation, warmth, disinfection, and other means for the prevention of disease. Since nursing has become more of a skilled art, many persons of good education have taken to the work for the love of it, as well as for remunerative employment, and facilities are now given at most of the large hospitals to enable women to obtain a practical acquaintance with nursing. The training varies from one to three or four years according to its thoroughness.

The chief points to which the attention of nurses generally may

be directed, are the counting the pulse and respiration, the condition of the tongue in health and in disease, the state of the skin, the temperature of the body as indicated by the clinical thermometer, various methods employed in dressing wounds, padding splints, and acting in emergencies. It is important also for a nurse to learn the use of trusses, pessaries, and other appliances used in the sick room, to administer injections (either by the rectum or skin), electricity, medicine and stimulants in the manner prescribed by the medical attendant. It will also prove of much service, if, in addition, the nurse acquires a knowledge of the doses, action and character of such drugs as are most generally employed, and of the natural functions of the body in health.

Those who are to wait upon the sick must prepare themselves for many disagreeable duties, entailing loss of rest, confinement, and much mental anxiety; for, although in public institutions these matters are well considered by a mutual division of labor, still, in private life, the nurse is expected in many instances to be constantly at her post, and it is unreasonable to hope that she can retain her faculties intact after days and nights of continuous watching. The nurse ought to have recreation, as well as sleep, and surely there are few cases which will not admit of some member of the family taking her place at regular intervals.

It is oftentimes remarked, that, in hospitals at all events, a greater responsibility lies with the nurse at night than during the day, and if this be so, it is essential that the night nurse should be in no whit inferior to the other. Considering the irksome character of continuous night duty, it is well that it should be alternated with day work, for periods varying from a month to three months at a time, and that in order to obtain uniformity, this arrangement should form a part of the nurse's engagement.

Those whose duty it is to wait upon the sick, to suffer the necessary confinement, loss of rest and other depressing influences, should themselves have health as good as possible, and be possessed of strength and stature sufficient to enable them to give all requisite aid in lifting, and in manual work, even that of scrubbing the floor, if need be. Activity and order and cleanliness, both in their own persons and about those they wait upon, are indispensable. All bad habits, such as waywardness of temper, forgetfulness, and, of course, addiction to drink, are insuperable objections; likewise the habitual practice of making unusual noises, such as humming, fidgeting and coughing. Neither should nurses be great talkers; some patients are

much annoyed with the garrulousness of their attendants. A nurse ought to be a light sleeper, awake to the slightest call or movement, and no snorer; a light mover about a room.

A good and obliging temper is of course highly desirable; equally so, sufficient good judgment in the management of the whims and peevishness of the sick, and to direct any little conversation into proper channels, avoiding all narrations of previous experiences, which are very apt to be indulged in.

It is not expected that all these are to be found combined and in perfection in one or every individual, but some degree, at least, to them should be sought for. Whilst laying down the qualifications for good nurses, one word may be said to those who employ them. If active, cheerful attendance is required, it must not be forgotten that this is almost physically impossible if a nurse be kept day after day and night after night confined in a close sick-room. Even if averse to it, both for her own sake and that of the patient, a nurse ought to walk in the open air at least one hour a day.

It is a great mistake to think that only women can nurse. There are many men, particularly husbands, who are quite as gentle in their touch, quite as thoughtful about little wants of others, and far more tender and considerate than many a woman. A man's **strength** is a great advantage. Ask a wife who required lifting from the bed, and she will tell you what a comfort it was to feel her husband's strong arms under her; she felt so **safe**. It is a dreadful feeling for a patient to doubt the power of the person assisting; the dread of being let fall may give a fright from which it will take days to recover. Let us all put away the wrong and foolish idea that nursing is **only** a woman's work.

There are five necessary qualifications for a nurse—Sobriety, Cleanliness, Firmness, Gentleness, and Patience.

Sobriety.—All to be said on this point is, if unfortunately you cannot resist the temptation of liquor, the sick room is no place for you, we **dare not** trust you.

Cleanliness.—Be always very clean yourself, and keep the room as sweet as can be. A very little thing will spoil the appetite of a sick person. Never let anything offensive, such as dressings from a wound or burn, remain in the room. Let every vessel be emptied as soon as it is done with, well washed out, and left outside in the open air. Later it may be brought in and put in a convenient handy place out of sight. Change the air continuously by having a suitable arrangement of the window, remember, **bad air will poison a person**

as surely as bad food. The poison of fever is dangerous or not, according as you do not or do weaken it with fresh air—just as you make spirits weaker by adding water, only with this difference that the fresh air **destroys the fever poison**; it also fortifies one against harm by the poison. Do not leave food in a room after the patient has eaten as much as he is to have or wishes. Do not let the drinking water stand long without being changed, as it quickly absorbs whatever gases there are in the air of the room; so that when the patient drinks it you are actually putting back into his stomach the poison which had been thrown out through the skin. Why do people stand pails of water in a place newly painted? It is because they know that the water takes up the vapor and smell of turpentine and oil as fast as it escapes from the walls.

Firmness.—Remember that firmness is not rudeness. You cannot expect a patient suffering to know as well what is best for him as those caring for him and whose brains are clear. Therefore if a certain thing is best to be done, do it; do it kindly, **but do it**, and do it at the right time; he will thank you for it afterwards.

Gentleness.—Whatever you do for the patient, be gentle. In a case of rheumatism or broken bone you must change the clothes, however painful the process of so doing may be, but do it as gently as you can. With care all jerks and knocks may be avoided. And lastly,

Patience.—Always remember the difference between yourself and the person under your care. Did **you** never feel irritable and restless, even when you were well? Have there not been some days when you were so easily put out, so cross that you were almost ashamed of yourself? How must it be, then, with the person who suddenly from leading an active life is compelled to lie still in one position, or with one whose whole body is racked with pain! Never lose patience, however sorely tried; bear with the trials of a sick patient for a while, and by-and-by you will be rewarded.

Few persons know the great value of a good nurse or the number of valuable lives saved by good nursing. And on the other hand, few are aware of the number of lives actually thrown away, their chance of recovery being lost by the lack of faithful, careful nursing. Any doctor can tell you how he has been disappointed, vexed, and his best efforts rendered useless by incompetent nurses and by that stupid obstinacy which almost always goes with ignorance. He will also tell you that it was often the honest, sensible nurse who really saved his patient by faithfully carrying out directions.

Not every one is fit for a nurse; not because they wilfully or carelessly do wrong, but because they are not **cut out for it**. Nursing is, in a great measure, a **natural gift**, in either man or woman; just as music, painting, and other things are. There are many kind-hearted yet thoughtless people who, with all the training in the world, would never equal naturally handy nurses who have had little training.

There is a saying that "Some people's fingers are all thumbs"—**awkward people**, people who are everlastingly getting into trouble. If such a one is going upstairs with her hands full, she steps on the bottom of her dress, drops what she is carrying and may go down herself. If the fire needs coal, she throws on a whole scuttleful, and annoys the poor patient so that he will not be at rest again for hours; instead of which she should have the coal brought in ready tied up in small parcels in paper. At least one of her fingers is usually bound up with a rag tied on with black cotton. If a little bread and butter is wanted, she will be sure to take the knife that has just been used for peeling onions. If there is cookery going on in the next room, the door will be left open, so that a strong smell of frying bacon, or whatever it may be, will fill the patient's room, making him feel worse; and then she is grieved because he says he can't eat a morsel of food. If he wishes for a glass of water, she fills it up to the brim, puts her hand under his head, and raises it till his chin touches his breast, then she puts the glass to his lips, spills a good part of it on his clothes, and thinks he is very awkward. When the patient is well enough to sit up in bed to take his food, she will put the tray on his knees and then raise him into the sitting posture; if the things are not upset all over the counterpane, it is more by good luck than good management.

Yet she is not a **bad-hearted woman**, though she is a **bad nurse**.

Then we have **the fussy nurse**, often a most kind-hearted, loving creature. She wishes so much to benefit her patient that she sadly overdoes it; she bustles in and out of the room every few minutes, wearies her patient by constantly asking him if he cannot eat something (which she would willingly walk miles to get if wanted), raising him up, tucking the bed in, drawing up and lowering the blinds; in short, she never can be happy to sit down quietly and wait patiently, but must be constantly on the move; it is, indeed, her very goodness which makes her weary the patient.

Then there is **the careless, slovenly nurse**. The doctor never feels sure that she has given his patient the proper quantity of medicine; if she happens to remember it he gets it, but if not she makes up for

it by giving him a double dose next time. There is never a clean glass or cup when wanted. Food is taken to him, and if he cannot eat it, it is left beside him for hours. There are so many crumbs in the bed that it feels to the poor sufferer like lying on a gravel walk. The slops, which ought to have been removed, are hid under the bed, filling the room with bad smells. Bits of meat, crumbs of potatoes, and other foods, are let fall on the floor and left there. The consequence is the mice, finding a warm room and something to eat, think it a very comfortable place, and use it freely, which proves anything but comforting to the helpless creature in bed.

There is also **the cruel nurse**, who does her duty, but not from love of it; she carries out the doctor's orders exactly. Her law, like that of the Medes and Persians, altereth not; if the medicine has to be taken at a certain time, she brings it to the minute, and insists on the patient taking it on the instant. If the bedclothes must be changed, and the patient says it hurts him much to be moved, she answers, "Can't help that; the doctor said it was to be done, and I can't go against his orders." She may be perfectly honest in all her dealings, but is without tenderness or compassion.

And lastly, we have what is fortunately a very rare character, **the dishonest nurse**. She drinks most of the wine, and eats pretty freely of the food intended for the sick person, and tells the doctor the patient ought to get better, judging by the quantity of nourishment he gets. She is sometimes dishonest in another way: she finds it a great trouble to compel the patient to take the medicine, so she just empties it away the regular dose at a time, so that when the doctor calls he sees the bottle gradually becoming empty, and feels satisfied.

Now these are not characters merely heard of or read of, but every one of them has been met in the sick room. The awkward nurse has been carrying a trayful of things, caught her foot in a bit of carpet, and made a smash. We have seen the careless nurse snatch a child out of bed, wet with perspiration, and set it on a chair with no extra covering, and make the bed. Once a little patient was ill and required a blister on the chest. The doctor put it on himself, and then left him in charge of one who turned out to be a **careless nurse**. When the doctor called the next day, he found he had been so neglected that instead of its being confined to the chest, the blister had worked around to his back, where it was left hours longer than it should have been, causing such a sore that for a week afterward the poor little boy could not lie on his back. In another instance a dishonest nurse, who broke the bottle containing the medicine, filled another with sugar

and water, and put the label on it. Fortunately for her the child did not die, or she would have been a murderess.

It is not absolutely necessary that a person wishing to help the doctor has to be highly educated. She must, however, possess "common sense," a sort of sense, however, not by any means common. It is the knowledge of common and every-day affairs. The helper should, however, be able to read writing, or she may be led by the appearance of drugs and bottles to make dreadful mistakes. She ought also to have all her five senses healthy and active—sight, hearing, feeling, smell, taste.

Sight, that she may be able to read directions, or to read aloud to the patient, and also to watch the changes of his countenance. A quick-sighted nurse will not need to wait till the sufferer asks for anything in words. She will from the motion of an eye, or the lips, or a finger, see in a moment what is wanted. It is a great comfort and satisfaction to a sufferer to have his needs and wishes anticipated by the thoughtful and observant nurse. **Hearing**, that she may catch the faintest whisper, and so not oblige a weak patient to exert his voice or to repeat every request. **Feeling**, that she may easily detect any change in the heat or dryness of the skin of the patient, and that she may not use any application which will either scald with heat or cause a chill with cold. **Smell**, that she may detect the least impurity in the atmosphere of the room, or in giving medicine notice if there is any mistake. **Taste**, that she may not offer food unfit to be used, or though good in itself, yet cooked in such a way as to be disgusting to the patient.

If she possesses these qualities, any woman will very soon, with a little instruction, be able to help the doctor. But there is one caution required: she must not have such a very high opinion of her own skill as to cause her to use it in opposition to the directions of the doctor. She is quite at liberty to suggest anything she likes. There is no objection to her saying, "Don't you think such a thing would do good?" or, "Don't you think we might safely do without such a thing?" But it is wrong to ask the opinion of the doctor, and then **act in opposition to it**. If he is fit to be trusted with the life of a fellow-creature, he ought to be trusted fully, and dealt with fairly.

General Instructions for the Sick Room

One Person Only Should Have Authority and Responsibility
for the Care of the Patient.

*Obedying the Doctor's Orders—Medicine—Food—Injections—Reading
to Patients. Quiet to be Observed.*

System and Management of Details.—When the care of a sick person is undertaken without proper arrangements being made as to the economy of time and strength, there is a waste of both, and the attendants are **tired out** and thoroughly unable to perform their duties, while the sick man is neglected, and everything goes wrong. It is necessary that the nurse must sleep or have leave to go to bed, either during the day or during the night. In critical cases it is important that a person of experience should be with the sick during what are called the small hours, that is to say, early morning, because it is well known that at such times there is a liability to great depression of the vital power. With regard to a substitute, however, one point deserves special attention: it is absolutely necessary that when she goes upon duty, and undertakes to be responsible for the conduct of the case, she should receive instructions of the minutest kind upon all points as to medicine, food, etc. In any serious case it is very important to make written notes of the patient's condition, recording the time, etc., of any uneasiness.

Many cases come to a bad and unsuccessful issue through neglect of the golden rule that one person, and one only, should be responsible for the conduct of the sick-room. For instance, how will it be possible, if there are several people in a sick-room, to maintain quiet and order, unless one is in charge, and has authority to dictate as to the treatment of the patient, and to see that the orders of the doctor are carried out. It may be that one of the patient's friends, either not knowing or, in his or her self-conceit, not approving of the directions of the medical man, may fancy that a patient who was ordered to be kept quiet would be the better of a little cheerful conversation, or that some new method of treatment might be entered upon. None but those accustomed to sickness have any idea of the popular prejudices and fallacies with regard to it, or form the slightest notion of the confidence with which advice is tendered by those who are ignorant of the case and are utterly incompetent to give any opinion upon the question.

It will be granted that all such feeble counsellors and advisers should be rigorously excluded from the sick-room, and the person of

authority over it will do well to keep them in remembrance, for they are a most intolerable nuisance to the sick man.

It seems scarcely necessary to say that, while strangers, gossips, and busy-bodies are kept strictly in check, it will often, also, be necessary in special cases to keep a watchful eye upon the admission of certain letters and newspapers (not to say telegrams and messages) which might contain intelligence often of an alarming or depressing nature. Bad news is always depressing, but especially so to the sick, who, when capable of being interested in conversation, should, if possible, be regaled only with topics of a light and cheerful description, and should be encouraged to look forward to the prospect of a happy future for themselves and for those in whom they take an interest.

The Nurse, Not the Patient, Responsible for the Carrying Out of Directions.—Full and proper directions given by the medical man should always be received by **one** person, who should be responsible for their being carried out, and should be acted upon without the patient having the trouble of thinking for himself about them. Nothing wearies and exhausts a patient more than having to **think**. He should be freed from all responsibility. He should be allowed to have nothing weighty on his mind. He should not be burdened with the fear of forgetting anything, and should have the comfortable sensation of having resigned the management of his case into other hands, in which he is to be, for the time, a mere passive agent. He should not be allowed to tax his memory by trying to remember the proper times for taking his medicine, or how it has acted; but should trust all these details to his attendant.

Should the Patient Be Told of His Danger?—It is now pretty generally known that it rarely if ever does any harm to make a patient acquainted (in a proper manner and at the proper time) with the nature of his case and with the opinion of the medical advisers as to the probable issue of it.

We are forced to admit that the contrary practice of former years originated, at all events, in the desire to adopt this convenient excuse for the concealment of ignorance as to the real nature and probable termination of the disease. The ridiculous airs of profound learning and mystery assumed by medical men in old time has been well ridiculed and burlesqued by many writers.

Even now the strongest possible prejudice prevails in the public mind against telling a patient that he is the subject of heart disease. But provided that the communication be made with the view of in-

structing and guiding the patient in the treatment of his case, it will be found that, instead of doing harm, it may be the means of prolonging his life and of increasing his comfort and happiness. There are many persons who have a mortal disease which might put an end to their existence at any moment, and yet the patient is the better for the knowledge of the facts of his case.

It is no doubt one of the most painful tasks that falls to the lot of the physician to pronounce that there is no hope, when such a verdict is evidently quite unlooked for, and when the patient, instead of expecting such melancholy tidings, is anticipating nothing but a speedy recovery. Young men and young women, it may be, in the prime of life, with a brilliant future apparently in store for them in this world, are sometimes found to be suffering from acute disease, which has come suddenly upon them, and which has already advanced so far as to leave no chance of life, while all the time no thought of real danger has as yet crossed the mind of one who, it may be, in a few days, or perhaps in a few hours, will be no more. Under such circumstances, when the physician has made up his mind as to the probable issue of the case, it is but fair—it is only honest, when appealed to—though with all due caution, to prepare the mind to receive tidings of the great change which is awaiting. Indeed, it is cruel to waste or lose any unnecessary time, because long before death actually takes place the mind may be clouded, and the attention and faculties so engaged in the struggle against the great destroyer, that the mind loses its final natural susceptibility to external impressions, and is utterly unable to deal with any subject, connected either with this world or with that which is to come. Here, as in every other relation in life, medical men, as well as the friends and relatives of patients, ought to follow the golden rule of doing unto others as they would be done by; and we think it would be generally agreed that no one would wish to be left in ignorance upon a matter of such momentous importance.

And here it may be said that it is needlessly cruel, and very unwise, studiously and mysteriously to conceal from children the fact that they are not likely to recover from a mortal disease. Surely it is a mistaken kindness, and one that argues little for the proper understanding which ought to exist between mother and child, to hear some parents, up to the moment of their child's death, assuring their child that it will soon be better. Any one who has seen the opposite course employed with children who have been sensibly brought up, will have been astonished at the very different effect upon their minds, and at

the dignity, fortitude, and good feeling exhibited by many children at such times.

Pictures and Prints in the Sick-Room.—Several years ago the attention of the public was drawn to the fact that the poor in our large hospitals were confined in the most cheerless wards or rooms, absolutely without any attempt at decoration; and it was suggested that private families might make a very acceptable donation to the governors of hospitals by presenting them with prints, pictures, etc.—chromo lithographs or those of a brilliant color being thought preferable. It was objected to this, even by some of the most eminent of the profession, that the presence of pictures in the wards was apt to suggest images to the mind of the sick man which might at certain seasons serve as food for his delirious fancies. It has now been proved by experience, however, that this is not the case, and that a patient is much more likely to conjure up for himself, at a time of delirium, frightful images from the bare walls by which he is surrounded, than from any of the beautiful and interesting objects with which they may be clothed. We therefore strongly advocate pictures for the sick-room, and would decidedly give a preference to those with a pleasing and simple subject, and to such as represent familiar incidents in domestic and social life. Even for the poorest class of patients such may be most readily obtained at a trifling cost. They may be either hung up as they are, or pasted upon a card board and varnished, or framed and glazed.

During convalescence from illness there is often a tendency in some patients to despondency and depression of spirits, accompanied by loss of appetite; and at such times, when they are confined to the sick-room, and can't be allowed to go beyond its door, it is surprising how their recovery may be hastened, and their imprisonment rendered endurable, if not agreeable, by a little attention to the *æsthetics*, not the least of which is to furnish them with nice books, pictures, flowers, etc.

For children, pictures are more especially necessary, not only on the walls, but they must have picture books which they can turn over leaf by leaf for themselves. This keeps them employed and amused, and is a great economy of the nurse's time and strength. The picture books should be made of calico, or some other material which cannot be easily torn, if they are to be given to young children.

Quiet.—How often does it happen that a doctor leaves his patient with the injunction that he is to be kept perfectly quiet, to which the patient assents, and the nurse promises obedience; and yet, no sooner

is the doctor's back turned than the sick room, instead of being sacred and unmolested, is made the scene for the reception of a levée, or for the transaction of all manner of domestic business! How often do troops of sympathizing friends force their way into it, each in his turn require to know the nature of the disease, and of the treatment which is being carried on, relating at the same time, their own wearisome experiences of what they fancy to be precisely similar cases, and contrasting and commenting freely upon the different plans pursued, with the effect, perhaps, of not only grievously fatiguing the patient, but of filling his mind with groundless anxiety and alarm! It ought to be quite sufficient, to prevent such intrusions, merely to say that all visitors are prohibited by the medical attendant. But there are a great many other reasons why the patient is to be kept quiet and undisturbed. Everything connected with the arrangement for his comfort, where practicable, should be done **outside the sick-room**, so that he may not be annoyed by any arrangements of a noisy character which can be avoided. The very least sudden or unwonted noise may alarm and seriously injure a patient suffering from nervous disease, and any noise which suddenly wakes a patient out of sleep does him real harm. Possibly hours may have been spent, and powerful doses employed for the purpose of lulling a patient to sleep, a sleep on which, perhaps, his recovery may hang, when some thoughtless and indiscreet person may spoil all by suddenly awaking him. A patient once roused from this kind of sleep, sometimes awakes excited, frightened, almost terror-stricken, and is sent to sleep again with much greater difficulty than if he had never been asleep at all.

It is not the absolute loudness of a noise which is injurious, but there are some noises which are exceedingly irritating, especially to the excitable ears of a sick person. Such are all rustling of dresses, whisperings, shakings, rattlings, jarrings of all kinds, the creakings of doors or of shoes, and the rattling of windows; the jarring tread of people overhead, or running up and down stairs, is frequently a source of great irritation to the sick man, who will tell you that he feels every step go through him. As a rule children are not so easily disturbed by noises as adults, and it is astonishing how very young children will sometimes sleep in the midst of noises all around and about them.

No attendant upon the sick should ever wear a rustling silk dress. The gown should be of a soft, limp material.

Reading Aloud to Patients.—To some this is torture, while to others it is pleasant and soothing. Some will say, "Read me to sleep,"

and will actually soon drop off into a doze after the first few pages of some sufficiently uninteresting work has been read to them. It must be admitted, as a rule, that most people read very badly, and that conversation is more adapted for the sick, because the tone of the voice is more natural and pleasing when talking than when reading and reciting.

Care should be exercised in reading stories to sick children, especially to those of a nervous, excitable temperament, for they often become interested in the story, and will beg it to be continued, little dreaming of the after effect upon their minds. The consequence is that at night the scenes of the story are repeated, with the most grotesque variations, making a sort of nightmare or night-terror, the effect of which is often to prevent sound sleep, and to exhaust the little patient's strength, besides seriously adding to the nervous symptoms which may be present.

The Administration of Food and Medicines. It is very difficult to get inexperienced persons to pay attention to **regularity** in the giving of food to sick people, and also the hours at which food can be taken by the patient. The stomach of a sick man is so very delicate and capricious that it requires to be carefully observed as to these particulars.

The stomach is often so enfeebled by disease that it cannot even take liquid nourishment, except in the smallest quantity at a time, and at proper intervals. For example, how many patients will tell a medical man that they cannot take milk, that it always makes them worse, that it creates the bile or the phlegm, or something of that sort, whereas, the fact is, that there are very few if any stomachs that cannot bear milk, provided it be properly administered. It is not to be wondered at that a delicate stomach, during disease, should reject milk, if a large draught, say half a pint or a pint, be taken all at once, and without any preparation. People forget that the stomach requires to be educated, oftentimes, before it will bear even those sorts of food which are most likely to be of benefit. Many patients have been kept alive almost entirely upon milk who were quite certain beforehand that they could not take it at all. But it should be given in small quantities at a time, and if there is much acidity a little soda or limewater may be added to it, and in cases of great debility, a little rum or brandy. Patients who have been sick after taking milk, and who have seen that they have vomited the milk in a state of curd, often think this is conclusive evidence that milk must disagree with them, not knowing that milk must always

undergo this change, by the acid of the gastric juice, before it can be digested or assimilated.

Some of these remarks apply also to beef tea, mutton tea, etc. A small quantity frequently administered, such as a teaspoonful every half hour, will often be retained, when a large quantity, say a half pint every two or three hours, would be rejected by the stomach. The doctor has very frequently to listen to the oft-repeated complaint, on the part of patients, that the nurse is always wanting them to take something, and that they can get no rest: and this is often very well founded, for a stupid nurse, without any system or method, generally contrives to be always tormenting the patient with something, whereas, by judicious arrangement of time, the patient could be got to take twice as many things with half the amount of fatigue. In critical cases, life may depend upon the careful and punctual administration, not only of stimulants, but of nourishment, and it will be readily understood that, when the stomach is only capable of receiving a small amount at a short interval, if that interval be prolonged the opportunity of saving the patient may be lost.

In cases of sickness of old standing, perhaps connected with disease of the digestive organs, there is sometimes so great a repugnance to food of any kind, and so little power of appropriating it, that the patient, if left in the hands of an unskilled nurse, would certainly die of starvation. In order to prevent this, it will be the duty of those who have the superintendence in such matters to exercise all the ingenuity of which they are capable in preparing and cooking the patient's food; in giving it to him at those times when exhausted nature most requires it—for example, during the night or in the early morning—and in changing and varying the time of meals according to the state of the appetite or inclination of the patient. It may be repeated here that, both to avoid the danger of disgusting the patient and in order to keep the sick-room at all quiet and in a wholesome condition, no cooking must ever be done there, nor must any food be left about. It is too common to find a room littered with half consumed puddings, jellies, oranges, apples, grapes, etc., all of which should be kept out of the patient's sight, otherwise he will not relish them half so much when he is able to take them. It can scarcely be too much impressed upon the mind of a nurse that she must plan and regulate the patient's diet according to system, and have everything prepared to carry out the proposed arrangements. It is cruel to torture a patient with questions as to the arrangement of his diet, since nothing is more necessary than that the mind should be perfectly at

rest and free from all thought and responsibility on such subjects. Wherever practicable and desirable, it is a good rule to have written directions from the medical man as to the administration both of food and stimulants.

Attention should be paid to the **quantity**, or rather to the **bulk**, of food or drink which a patient may properly consume. Brandy and wine, when ordered to be taken with water, are sometimes so "drowned" that the enormous quantity of fluid dilutes unduly the gastric juice, and weakens the already enfeebled digestive power of the sufferer. Beef tea, broths, and farinaceous foods are also often made too thin or too bulky. Nothing disgusts a sick person more than to have large quantities of food put before him. When a little gruel is ordered, the nurse perhaps, instead of a cupful, brings a basinful, with the effect of nauseating the patient by the sight of it.

A cup of beef tea, or mutton tea, or something of the kind, may always be kept at hand, warm, and it is wonderful how refreshing it proves to those who are wearied and exhausted by disease, and who lie awake in the early morning, ready to "sink through the bed," from sheer weakness. They will often go to sleep directly after having had warm and strengthening refreshment. Even a cup of tea or of coffee, at such times, will soothe and comfort a patient, and therefore the means of procuring these readily should always be available.

Some people have the idea that calf-foot jelly is one of the most nutritious articles that can be given to a sick person; consequently it is and has been in great favor in the sick-room, and has almost been looked to as a sovereign remedy in cases of desperate weakness. Others have gone so far as to state that it **has no nutritive power whatever**. The truth, however, lies, as usual, between the two extremes. Pure gelatine, if given alone without any other article of food, has no power to support life; but when given **along with others** it is a substance which helps to build up, and to supply the waste from the animal frame. Moreover, it is a convenient vehicle for wine and for nutritious articles of food. Sometimes, and in many diseases, it is agreeable to the patient, and easily taken, so that there is no reason whatever why this old favorite should be entirely banished from the sick-room, as suggested by some people.

Nutritive Injections.—It occasionally happens that food of any kind whatever is rejected for a time by the stomach. This occurs in disease of the stomach, and in the course of other affections, after severe operations, etc. In such cases (generally of great extremity) it becomes necessary to nourish the body by means of fluids, intro-

duced into and absorbed by the lower bowel. Beef tea, milk, brandy or wine, and other like substances, are given in this way. The great rule to attend to is not to give them quickly, otherwise they are sure not to be retained till any quantity is absorbed. They should be given slowly, and without causing any irritation. An ordinary enema tube of any kind may be used—the simpler the better. Difficulty of retention may be counteracted by the addition of five to ten drops of laudanum if admissible. Such injections, too, should always be small in bulk.

Medicines.—The first duty of the nurse, as regards medicines, is to attend to the **regularity** with which they are given. There are many remedies which, unless given according to system, do not have their characteristic action, and, consequently, the design of the physician is frustrated. In most diseases, however, **sleep** is of the utmost consequence, and, as a general rule, it may be said, a patient should never be aroused from slumber on account of his medicine, which may be given to him as soon as he awakes. Medicines are disagreeable at any time, but they are much more so when a person is roused from a refreshing sleep to have them administered.

As regards **sedative** or soothing draughts to be given at bedtime, one caution is necessary. Unless the patient is kept perfectly quiet, and nothing allowed to disturb him, the effect of the sedative draught will be to excite instead of to compose him; therefore it should never be given till all preparations for sleep are completed.

Medicine is generally given to produce some **effect** which can be observed by the senses; it is therefore of the first necessity that the nurse should mark this, and be able to communicate it to the medical attendant at his next visit. For instance, some medicines are given with a view to produce sleep or perspiration, or increased action of the bowels or kidneys, and the effects of prescribed remedies in these aspects must all be carefully noted by the nurse. It is usually well also for the doctor to tell the patient what effect the medicine will have, as the result is then more likely to be successful.

When medicines are ordered in **drops**, it is better to avoid the troublesome and uncertain process of dropping from the lip of the bottle; it is well known that fifty drops from one bottle may only equal in bulk thirty drops from another; therefore the drop-measure or measuring glass ought always to be used.

Many substances are employed to remove the nauseous **taste** of medicine, especially in the case of children; but, as a rule, sweet things, so generally given, are objectionable; and experience has

proved that nothing is so effectual as a piece of dry biscuit or oatmeal cake.

It is astonishing how many people, even grown-up people, have a difficulty in swallowing **pills**. Any one, however, can readily acquire the habit by practicing with pills made of bread crumbs; and when it is considered how very desirable it sometimes is that medicines should be given in this form, it will be well that any one who suffers from the sort of nervous difficulty alluded to should endeavor to overcome it.

Effervescing mixtures are generally agreeable to the palate of the patient, and are, besides, often serviceable in allaying irritability of the stomach. Care should be taken to give them while they are actually in a state of effervescence, and not when the carbonic acid gas has evaporated, or, in other words, when they are flat. The powder of citric or tartaric acid, or the lime juice, if that be used, should, first of all, be put into the glass; then, when the patient is ready, the dose of the medicine should be poured over it, so that it may be taken while in a state of brisk effervescence.

When medicines are ordered containing chalk, magnesia, or insoluble powders, which by their gravity **sink to the bottom** of the phial, a label should accompany the bottle directing it to be shaken before each dose of the medicine is poured out. If this is not attended to all the active ingredients accumulate at the bottom, the patient takes an almost inert mixture for perhaps a couple of days, and then gets an overdose at the last. This direction is no less to be attended to in the case of light medicines, lighter than the water in which they are mixed, and which **float at the top of the bottle**. For instance, prussic acid, which is often prescribed in medicinal doses, is apt to float at the top of any mixture containing it, and if the bottle be not properly shaken, as directed, the patient might get too large if not a poisonous dose all at once. Sulphuric ether is still more likely to float.

Any person of intelligence can easily understand that it is impossible to give all the directions necessary for the continued and proper administration of particular medicines upon the label of the bottle; and therefore we would caution nurses to listen attentively to the directions of the medical man. As an example of what is meant, we may instance the case of a patient taking tartaric emetic. The doctor may perhaps direct that it is to be discontinued, or to be given in a smaller dose if it causes sickness after the third or fourth dose, while he informs the nurse that he will not be surprised at its causing sickness at first, and trusts that it will be taken afterwards without that

effect. He may warn the nurse that it may produce undue action of the bowels, in which case he may wish it stopped; or, he may explain to her the exact effect which he wishes to be produced, and may direct the remedy to be continued in a larger or smaller dose, and at a longer or shorter interval. Now, it will be seen at a glance that it is impossible to convey all this upon the label of a bottle, and yet the successful issue of the case may depend upon the intelligence of the nurse in appreciating, and her skill and faithfulness in carrying out, the doctor's orders.

Peculiarities of Patients in Regard to Medicines.—It is well known that some patients are peculiarly affected by certain remedies, and it is highly desirable that any such *idiosyncrasy* should be known to the physician, if it is known from former experience to exist.

INSTRUCTION SIXTY-ONE—*Observation*

The Three Vital Signs In Observing the Patient's Condition

What the Nurse Must Report to the Doctor

*How to Feel the Pulse,
Take the Temperature, and
Count the Respirations.*

Nurse's Report—Points for Observation—Pulse—Temperature—Condition of Respiratory Organs—Appearance—Posture—Mental Condition—Sleep—Pain—Urine and Motions—Tongue—Appetite—Thirst—Vomiting—Effect of Remedies.

As successful treatment depends upon a correct appreciation of the symptoms which are the signs of disease, it is important that the nurse should carefully note any change in the symptoms of a patient during the absence of the doctor. It is also helpful to the doctor to know what has been the previous condition before his first visit. And it is well for one to be able to form some idea of how sick a patient is and whether the doctor should be called at once or at a more convenient hour of the day.

The pulse, temperature, and respiration are called the **three vital signs**. Everyone should understand them and recognize variations from normal and their significance. They are so closely connected that whatever affects one generally affects the others, but in certain diseases they do not vary together.

The nurse in attendance on the case, when the doctor visits, should furnish a report which should comprise the following points:

1. **The Pulse.**—Each time the heart contracts, blood is pumped into the arteries, distending them; by the elasticity of their walls the arteries then contract and the blood is forced on into the capillaries and veins because it is prevented from returning into the heart, by the closing of the aortic valves. It is this distension, or rising-up of the wall of the artery, at intervals corresponding with the beatings of the heart, that is called "the pulse." In feeling the pulse we should determine its frequency, its force, its fulness, and its rhythm. Body position and action alter the pulse rate. It is generally faster in standing than in sitting, and faster in sitting than in lying down; it is slower in sleep and faster toward death; slower in old age than in middle life, slower in men than in women, faster in children than in adults, and faster during excitement or exercise.

To take the pulse, two or three fingers should be placed on the radial artery at the front and near the thumb side of the wrist or on the temporal artery just in front of the ear. The pulsations are counted, preferably for a full minute, or for at least a half minute, multiplying the result by two. The thumb should not be placed on the artery, because this method is awkward (except in counting one's own pulse), and also because the pulsations of the artery in the thumb are frequently so perceptible as to be mistaken for those of the other person's artery and so one counts his own pulse rate rather than that of the patient. The pulse should be taken while the person is tranquil. It may be taken while standing, while sitting, and again, while lying down, the difference being an indication of the heart's condition and power.

Table of Pulse Rates.

The pulse rate in the infant at birth is from 130 to 150 a minute.

The pulse rate at 1 year is from 110 to 130 a minute.

The pulse rate at 2 years is from 90 to 115 a minute.

The pulse rate at 3 years is from 80 to 110 a minute.

The pulse rate at 7 years is from 72 to 90 a minute.

The pulse rate at 12 years is from 70 to 76 a minute.

The pulse rate in early adult life is from 70 to 75 a minute.

The pulse rate in late adult life is from 65 to 70 a minute.

The rate of the pulse may increase in old age, and in healthy adults it may be persistently high or low, even as low as 45 to 60.

2. **Temperature.**—In health the temperature of the body taken in the armpit is found to be approximately 98.4° F., with a slight variation in the daily course; i. e., the temperature steadily rises during the day to some time between 5 and 8 p. m., and then falls towards the early hours of the morning, reaching its lowest point between midnight and 4 a. m. It also varies slightly with the age, the mental



Fig. 318. A clinical thermometer to test the body temperature. B, an enlargement in the bore, owing to which the mercury stays as high as it goes (registers the maximum temperature) until forcibly shaken down.

state, work, relation to meals, etc., being slightly elevated after full meals and after exercise or strong emotions. It is often a little higher in children and lower in the aged. Free perspiration lowers the body temperature. If the temperature stays long below 95° or above 108° F. death is very likely to occur.

The pulse usually increases 8 or 10 beats per minute with each rise of 1° F. A sudden and marked rise or fall of temperature is a sign of serious illness and a doctor should be called. Sudden changes in temperature are not uncommon in children and in hysterical persons, without any serious accompanying condition.

In fevers this variation is intensified; therefore, in taking the temperature, two observations should be made—at about 8 to 9 a. m. and 5 to 6 p. m. This will give the minimum and maximum temperature daily.

The temperature is taken by means of a clinical thermometer, which is self registering, and therefore does not require to be read while in position; the scale extends usually from 94° to 110° Fahrenheit.

Each degree is marked by a long line, and the spaces between the lines are each divided into five equal parts; each part equals "two points," or tenths, of a degree; the normal temperature, 98.4° F., is marked on the stem by an arrow; the thread of mercury in the stem is retained in its highest position owing to a constriction (or an expansion) of the bore just above the bulb.

To Take the Temperature.—Shake the mercury down to 95° F. or lower; wipe the armpit with a dry cloth, place the bulb of the thermometer in it, press the arm closely to the side, and keep it here for at least ten minutes. The armpit is usually half a degree cooler than the mouth, while the rectum and vagina, being always closed, are usually half a degree warmer than the mouth. The temperature is also commonly taken in the mouth, because of the greater rapidity and of the accessibility of the part. The bulb of the thermometer is to be placed under the tongue at one side and the lips kept closed for two or three minutes. It must be made sure that no hot or cold drink or food has been taken shortly before. In children and in adults, under special circumstances, the temperature may be taken in the rectum. After use the thermometer should always be washed in cool water (never in hot water) and it may be conveniently kept in a cup or glass of water containing boracic acid, when it is to be used frequently. A wad of cotton batting should be put in the cup to protect the thermometer from breaking.

The temperature may be recorded on a chart.

Crisis in disease is a sudden change towards either recovery or death. It is generally denoted by some well-marked occurrence, such as profuse perspiration, discharge of blood, skin eruption, or by copious sediment in the urine. The fever goes down and the patient may fall into a refreshing sleep if recovery follows. When fever goes down gradually, a little each day, it is said to go by "lysis."

3. **The Respirations.**—These may be frequent or slow, rapid or prolonged, forcible or feeble, spasmodic, wheezing, or stertorous, difficult or labored, regular or irregular. To count the respirations, place

the hand upon the patient's chest, or watch the rise and fall of the chest, and count the number per minute; an adult breathes about seventeen times a minute, i. e., one breath to four heart beats. An infant breathes thirty to thirty-five times a minute; at five years of age they number twenty to twenty-five, and about the eighth year they are eighteen or thereabouts. The patient should not know that his respirations are being counted, as that tends to change their number. In children and in men the respiration is **abdominal**; in women it is chiefly **thoracic**.

4. **Appearance of the Patient.**—This may show whether he has changed for the better or the worse.

The expression on his face may indicate pain, anxiety, or vacancy, or it may be calm, hopeful, and intelligent; the skin of the face may be bright red, congested, and dark, or it may be pale in color; the lips may be crimson, purple, or white and bloodless; the nose may be pinched, the cheeks may be sunken, and the temples hollow; the eyes may be glassy and staring or dull and heavy; the patient may lie in a listless manner, or he may be restless; he may pick at the bedclothes, and his movements may be tremulous.

Countenance.—The expression and aspect of the human face is much and peculiarly affected by the various diseases which affect the body, and the first view of a countenance often conveys to a physician who has studied the subject, immediate, valuable, and certain knowledge as to the nature of the disease for which his patient is about to ask advice. The indications are partly due to the changes of complexion which are associated with different forms of disease; but expression is equally significant.

Some general facts relating to the appearance of the countenance and expression are well ascertained guides in diagnosis. Pallor, as it occurs in anæmia and chlorosis, presents a different appearance from the same symptom when it is preceded by the shock of an accident, or when it accompanies consumption or scrofula; and the pallor of Bright's disease and some affections of the heart is peculiar on account of the glazed look and puffiness about the eyes, characteristic of dropsy. The expression of features suggestive of fear and anxiety is marked in heart disease, in croup, diphtheria, in persons liable to periodic attacks of epilepsy or asthma, or who may be suffering from malignant disease of some kind. A morbid indifference to external objects is the common expression of persons suffering from melancholia; while a reverse condition is peculiar to those about to suffer from delirium. The red mark

on the cheek, "the spot which autumn makes upon the faded leaf," is characteristic of the hectic of consumption, or the hectic fever accompanying any other complaint of a severe type. A dull expression on one side of the face, while the other is marked, it may be, with a sardonic grin, is peculiar to some forms of paralysis. The purple or blue color of the lips and cheeks is noticed in cyanosis or the "blue disease," and in other affections of the heart and blood-vessels in which the blood is not sufficiently aerated. A sunken, pinched expression of the features is peculiar to peritonitis in its last stage, and also to cholera; and is often premonitory of approaching death in other diseases. The "Hippocratic face" is marked with a dry, livid, and dark skin, hollow eyes, the skin of the forehead rough and distended, and the ears abnormally cold. There is little difficulty in tracing jaundice and other irregularities in the biliary secretion from the marked yellow hue of the skin, and children and others suffering from scrofula are marked with the thick upper lip, delicate skin and fair complexion, peculiar to that disease.

5. **Posture of the Patient.**—(i) In exhausting diseases patients lie in a horizontal position, but owing to their extreme weakness they have a tendency to slip down into the middle of the bed.

(ii) When the breathing is difficult, patients cannot lie down, but have to be propped up, or may sit up and lean over a chair-back.

(iii) In local disease patients lie, as a rule, **on the healthy side**, but in chest affections they frequently lie on the diseased side.

(iv) In inflammation of the bowel patients lie on their backs, with their knees drawn up; this position straightens out the back (doing away with the lumbar curve and so making more room in the abdomen) and relaxes the abdominal muscles, and so tends to ease pain, by lessening the pressure within the abdomen. The muscles of the belly are usually held tense if there is acute pain or tenderness within the abdomen, because the pain due to movement is then limited.

(v) In colic the patient usually lies on his face.

(vi) A patient should be assisted to retain the easiest and best position; this can be done with pillows.

In exhausting diseases, lying long in one position causes a tendency to congestion of the lungs; the patient's position must be therefore altered from time to time.

In some diseases, such as inflammation about the heart, a sudden change of posture is dangerous; change of posture in a patient must be reported to the doctor on his visit.

A bed-rope attached to the bed or ceiling (or stretched across the bed at a handy height to be reached) is of great help in enabling a patient to change his own posture.

6. **Intelligence.**—The patient may show his usual intelligence, or he may be dull and stupid.

7. **Delirium.**—This may be boisterous (maniacal), or low and muttering (typhoid). Delirium, as a rule, increases towards night and decreases towards the morning. When a patient is delirious, he should be humored and not actually opposed, and a close watch should be kept on him, lest he jump out of bed, or out of the window.

8. **Manner.**—This may be calm and collected, or excited, or depressed.

9. **Temper.**—The patient may be irritable and peevish, or quiet and good-tempered.

10. **Sleep.**—The amount of sleep patients have should be noticed; also whether it is calm and sound, and whether it is accompanied or not by heavy breathing. When food and medicine are ordered at regular intervals, the nurse must ascertain from the doctor whether or not the patient is to be awakened to take it.

Coma.—A state of insensibility, resembling sound sleep, from which the person either cannot be roused at all, or only to partial consciousness. The condition is generally the result of pressure on the brain, either from injury to the skull, or from effusion of blood or watery fluid, or of matter, within the head. In apoplexy, poisoning by narcotic drugs, and complete alcoholic intoxication, the comatose condition exists; it may also occur as a symptom preceding death in various diseases, especially of the brain and kidneys, and is not uncommon in the contagious fevers. In coma the action of the heart continues sufficiently perceptible; in fainting it does not.

11. **Pain.**—The points to be noted with regard to pain are: Situation, intensity, whether affected by movements, and what gives relief.

12. **State of the Skin.**—The points to notice are: Whether it is dry, moist, or perspiring; hot or cold; smooth, or shrunken. The skin after being cold may shortly become hot, moist, and perspiring; the time when this occurs should be noted.

The color of the skin should also be noticed: whether it is pale, bluish, flushed, dark and congested, or yellow.

Complexion.—The hue of the face. Much information may frequently be obtained of the existing constitutional condition, by observation of the complexion; but in judging, it is requisite to consider

the original temperament, and the family descent of the individual. In fair races, such as the Anglo-Saxon, a certain amount of color is usually associated with our ideas of health, and in some respects truly so; the reverse, a perfectly pallid face, can scarcely be consistent with a sound bodily condition. But color may be too high at all times, and the capillary vessels of the face, partaking of the fullness of those of the body generally, may indicate that from some cause, such as over-feeding, or indolence, combined with good digestive powers, the system of the individual is too full of blood; for the color is not confined to the parts naturally tinged, but is diffused over the face generally, and even the white of the eye is covered with distended vessels. Such a state is one of danger, it is often accompanied with headache, giddiness, confusion of thought, sleepiness; and when these occur, apoplexy may be dreaded. A high or brilliant color, also, may accompany the consumptive constitution, but in this it is very generally associated with a fine skin, and often with light or red hair, with freckles and also with a pearly or bluish appearance of the white of the eye. This appearance of high health is apt to deceive the inexperienced, but the color is generally not equal or persistent; it varies much, being easily heightened by excitement, or depressed by the reverse, and it continues to add beauty even to the last stages of the hectic of consumption. In the dark haired, and dark complexioned, color is less commonly developed. The complexion of disorder or disease is very varied; it may be muddy, pallid, pasty, white, sallow, cachectic, yellowish green, and purple.

The muddy complexion may be the natural one of the skin, but it frequently accompanies dyspeptic ailments, and is directly dependent on depressed nervous power, and languid circulation of blood; it is most strongly marked in the dark depressions underneath the eyes. Whatever lowers or exhausts the nervous power, will produce this complexion, which may be seen in perfection, when the light of morning shines in, either upon the votaries of a too protracted dance, or upon the weary watcher beside the bed of sickness. Sleep is the best restorer of the exhaustion of nervous power indicated by this condition of complexion; but if rest is impossible, it is one of those cases in which stimulant, hot tea or coffee first, and then alcoholic stimulant, is perfectly requisite. The pallid complexion is often the result of too close confinement to the house, and especially of deficient exposure to diffused daylight; it is well marked in miners. The pasty complexion requires a good allowance of animal food, in preference to milk and grain preparations, puddings, etc., of which people with such are

often too fond. They almost invariably derive benefit from preparations of iron. A marked white complexion not natural to the individual, is often indicative of serious disease, probably of the kidneys or heart, and when it appears in persons advanced in life, the cause ought most certainly to be investigated by a medical man. The sallow complexion is very generally a natural one. The cachectic accompanies a diseased state of the system, and often of the abdominal organs—it is muddy, and accompanies emaciation of the features. The yellow complexion may be the bright hue of jaundice, or the muddy yellow associated with malignant disease, especially cancer. In the greenish yellow skin of chlorosis or green sickness, there is also extreme pallor of parts usually colored—such as the lips. A purple complexion is indicative of deficient oxygenation of the blood, either from disease of the heart or lungs; generally of the former.

Eruptions or rashes making their appearance on the skin should be carefully noted. The time and place of first appearing and the way the rash spreads or changes should be noted also.

13. **Rigors.**—Any shiverings or chilly feelings which take place should be noted, and the exact date when they occur should be carefully put down.

A patient during a rigor should be covered up warmly, a hot-water bottle put to his feet and a warm drink given him; stimulants are here to be avoided, as they are dangerous.

14. **Cough.**—The points to notice are: The frequency, the severity, the duration; whether it is brought about by some apparent cause, such as change of posture, cold air, etc.; whether it is dry and tight, or soft and loose; whether it is barking, deep, and distressing, or short, sharp, or hoarse; whether it is in paroxysms; whether there is any expectoration with it; whether it gives relief, or whether vomiting comes on after it.

15. **Expectoration.**—The patient should be provided with a spitting-cup, and the sputum kept for the doctor to examine.

The sputum may be watery and frothy; yellow, thick, and purulent; rusty, or streaked with blood, or wholly blood. If it is blood, it should be noticed whether the patient coughs it up, vomits it up, or brings it up from the back of the throat.

16. **The Urine.**—The patient may pass this freely or with pain; in a large or small stream, or in drops; or he may not pass it at all (retention of urine). The quantity may be increased or diminished; the color may be pale, yellow, or smoky red; and there may or may not be a deposit. A specimen of urine (preferably that first passed

in the morning, or better still, the total urine for twenty-four hours), placed in a clean vessel, and covered with a piece of paper, should be kept for the doctor's inspection.

17. **State of the Bowels.**—The points to notice are: The color, consistency, frequency, and volume of the motions; whether there is blood or slime; whether there is pain, griping, or straining in passing them.

18. **The Tongue.**—This should be inspected before food is taken. It may be pale; too red; furred; dark-colored and cracked; swollen; protruded with difficulty; protruded to one side; tremulous; moist or dry. The manner in which the tongue cleans after illness should be noticed.

19. **Appetite.**—The points to note are: The amount of food taken, and the frequency; whether the food is taken with relish; whether it satisfies; whether tasted; whether followed by pain, eructations, or vomiting; whether digested.

20. **Thirst.**—This should always be attended to. For quenching thirst slightly acidulated drinks are the best.

21. **Vomiting.**—The chief points to notice are: When and how often it occurs; whether it occurs after or before food; if it causes much pain, straining, or retching; if it leaves much weakness; the nature of the vomited matter; whether it occurs at any particular time of the day.

22. **The Effects of Remedies.**—The following remedies have specific actions when given in excess, which should be noted. These are ill-effects and undesired.

(i) Strychnine causes twitching of the muscles and stiffness.

(ii) Arsenic, pain in the abdomen and symptoms like those of catarrh.

(iii) Quinine, headache and ringing in the ears.

(iv) Mercury, soreness of the mouth, especially of the gums, and a profuse flow of saliva.

(v) Belladonna, dryness of the throat, dilatation of the pupils, and sometimes a red rash.

(vi) Opium, progressive stupor and contraction of the pupils.

(vii) "Headache powders" may cause extreme depression and are always dangerous unless made from a doctor's prescription.

What to Do and How to Prepare for Cases of Sudden Illness

Selection and Preparation of the Room—The Bedstead and Bed—How to put on a Draw-sheet—Fracture Bed—Carrying the Patient upstairs to his Room—Removing the Clothes—Lifting the Patient into Bed—Preparation for the Doctor's Visit.

In case of accident or sudden illness, if possible, send a messenger at once to the patient's house, in order that arrangements may be made for his reception. In the meantime give the necessary first aid.

1. Selection and Preparation of the Room.

(i) **Selection of the Room.**—The room should be easily accessible, it should be large and lofty with a south or south-west aspect, the windows should admit sufficient light, and should open top and bottom. A fireplace with a chimney that does not smoke is always a good thing in a sick-room.

(ii) **Preparation of the Room.**—The room should be thoroughly cleansed (if time will permit of it), well ventilated by opening the windows; a fire should be lighted in it if the weather is cool, and it should be warmed to 60° F. and maintained at this, a thermometer being hung by the bed for the purpose of regulating the temperature; the carpet, curtains and all superfluous furniture should be removed.

2. The Bedstead and Bed.

(i) **The Bedstead.**—Wide bedsteads are unhandy, as the patient cannot be easily got at; the best kind of bedstead is an iron one, 3 to 3½ feet wide by 6½ feet long. It should be placed away from the wall (so that it can be approached from either side). The best place for it is across the room between the door and fireplace with the head facing the window.

(ii) **The Bed.**—Feather beds are to be avoided. Hair mattresses are the best. The bed clothes should be light and warm; no vallances or curtains should be used about the bed and the space under the bedstead should be vacant.

The bed should be made and the bed clothes well turned down. Two stout chairs should be placed next to the bed, on which to rest the stretcher while the patient is being undressed. In cases where the injuries are severe, or mud-stained clothes have to be removed, or extensive dressings applied, it may be necessary to have a second

bed or couch in the room on which first to lay the patient. Extra blankets and hot-water bottles should be got in readiness.

In cases of collapse the blankets should be well warmed and flannel should be wrapped round the hot-water bottles to protect the patient from burns.

If the bed clothes may be soiled, as in cases of extensive injury, or where dressings have to be applied, or where the patient is unconscious or extremely weak and passes his evacuations while in bed, a **draw-sheet** should be placed on the bed.

To Put On a Draw-Sheet.—Take a large cotton sheet, fold it lengthways twice, i. e., into four, and lay it across the bed so that it will reach from just below the patient's shoulders to his knees; now place a piece of macintosh or oilcloth between the draw-sheet and the under sheet, the macintosh being about 4 inches narrower than the draw-sheet; one end of the draw-sheet is tucked in under the mattress, the other end is folded up on the opposite side of the bed; when the part of the draw-sheet under the patient becomes soiled it is withdrawn a little to one side and tucked away a little more.

In cases of fracture the patient may have to lie in bed for several weeks, and it is important to have a properly arranged bed—a so-called "fracture bed."

The Essentials of a "Fracture Bed" are:

- (i) It should not sag or give way.
- (ii) The surface should be smooth and comfortably elastic.
- (iii) The foot of the mattress should be a little higher than the head.

A good way to arrange a fracture bed is as follows: First place a straw tick on the bedstead; on it place two horsehair mattresses $3\frac{1}{2}$ to 4 inches thick, and on the top mattress one blanket; to raise the foot place a board under the legs.

In fracture of the lower extremity or of the spine, there should be no pillows for the head, but only a thin cushion, and boards should be placed across the bed under the mattress.

A **cradle** to take the weight of the bed clothes off the patient may be necessary in fracture of the lower extremity, or sprain of the ankle joint; for this purpose a cardboard box with hole cut in the end, or a piece of cardboard folded, or a three-legged stool may be used.

3. **Carrying the Patient Upstairs.**—The hall and staircase should be cleared to allow room for those carrying him to pass.

The best method for carrying him will depend upon the nature and extent of the injury, and the condition of the patient.

A patient may be carried upstairs—

(i) By a single bearer, according to the methods laid down under "Transport of the Sick or Wounded."

(ii) By two bearers, according to any of the methods laid down.

(iii) On a stretcher. The head should go first, and the two bearers at the foot should keep the stretcher as nearly horizontal as possible by raising it.

(iv) By putting the patient sitting in a strong chair and carrying him up backwards. A third person follows the chair, helps to support it, and prevents the patient from falling out.

4. **Removing the Patient's Clothes.**—Before putting the patient to bed his clothes should be first removed. Great care should be taken in doing this; in serious cases it is better to cut them away.

In removing a coat, draw out the uninjured arm first, and in putting on anything put the injured arm in first.

In removing trousers from an injured limb it may be well to rip up the outside seam.

In removing clothing in cases of burns and scalds, cut away the parts which are not adhering, and soak the adhering parts well with oil or in a warm bath of water before removing them (see "Burns and Scalds").

5. **Lifting the Patient Into Bed.**

(i) If the bed is narrow and there is room for the stretcher, place it on the floor with the head close to the foot of the bed; three persons can then lift the patient by the shoulders, hips and legs, head foremost over the foot of the bed.

(ii) If the bed is wide, place the stretcher close alongside the bed, the patient's head near the head of the bed; the patient is then lifted by three people, a fourth person pulls the stretcher away, while the others lift the patient and place him on the bed.

6. **Preparation for the Doctor's Visit.**—When calling a doctor, tell him as exactly and as briefly as possible the nature of the case so that he may come prepared.

The following should be in readiness:

Plenty of hot and cold water, clean towels and soap, and a pail for dirty water.

For Burns and Scalds.—Plenty of clean old linen, cotton wool, olive oil, "carron" oil and bandages, if obtainable.

For Hemorrhage.—Ice, sponges, and plenty of water.

DIRECTORY

OF

GENERAL INFORMATION

For Those in Charge of A Patient

How to Wash, Bathe and Sponge the Patient.

The Application of Mustard and other Poultices.

How to Apply Hot Bottles.

When and How to Give a Child a Warm Bath.

A Simple Method of Applying Moist Heat.

How to Apply Friction to the Body.

Quick Way to Give a Hot or Cold Douche.

The Proper Method of Placing Cold Applications to the Head.

How to Give and Prepare Enemas, for the Injection of Fluid into the Bowels.

INSTRUCTION SIXTY-THREE—*Directory*

Attendance to Patient.—How to wash, sponge, bathe, or otherwise clean the patient are important details in a nurse's work.

It is well known that patients are more grateful for being properly attended to in this way than perhaps any other, and it can be easily understood how great is the feeling of relief and comfort experienced by a patient, who has had removed from him the noxious and irritating excretions and exhalations of his body. The first point to attend to is, how sufficiently to cleanse the patient without exposing him to a chill of the surface. A skillful nurse, even in a very bad case, can easily manage this without much trouble either to herself or to the patient. When it is desirable thoroughly to cleanse the skin, and at the same time to avoid all chance of chill, it will be necessary that the nurse should use a small basin, with moderately hot water, a piece of soft flannel or a sponge, with plenty of soap. Only a small portion, or a single limb, or part of a limb, is to be washed at one time. The operation is to be quickly performed, the part speedily dried with a soft warm towel, and replaced within the bed-clothes. Care should be taken

Subject Reference

For Prescriptions; The Use and Action of Medicines; and other Curative Measures, see pages 588 to 679.

to have everything in readiness, and at hand, so that all may be speedily accomplished, and the patient not fatigued or chilled by having to wait until the different articles are obtained. It is astonishing how very easily the patient may be kept clean by a little common-sense management in this way.

Sponging.—In certain cases of fever and acute disease, it is frequently necessary to sponge the body over with tepid or cold water, in order to reduce its temperature, and allay irritation. This requires to be very skillfully done, in order to have a good effect; a large soft sponge, or two or three small ones, just moistened sufficiently to prevent dripping, should be passed quickly over the surface of the body, which should be quickly dried. If the patient is able to bear it, his night-dress should be removed, and he should be laid upon a blanket on a sofa or bed, close to his own bed; the sponging should be rapidly and efficiently performed, and a clean night-shirt put on, and he should then be removed to his own bed, where he will experience a feeling of the greatest comfort and relief. This process may be repeated several times with benefit, where there is fever and heat of skin.

Sponging the body with vinegar and water is of decided value in checking the exhausting perspiration so distressing and so commonly met with in the course of consumption, and other chronic diseases. The sponging should be quickly done, especially over the chest, neck, arm-pits, and face, and between the shoulders, and the parts should be quickly and briskly dried with a soft absorbent towel. In certain cases of consumption, and in persons generally with delicate chests, great benefit is sometimes to be derived from sponging the chest, night and morning, with salt and water. A handful of salt should be used to a basin of water, the upper part of the chest and the arm-pits should be well sponged, and the drying performed quickly. If properly and efficiently performed, no fear need be entertained of catching cold, even by the most delicate, either in summer or winter; in fact, it is one of the best preventives of cold that there is.

How to Apply Mustard Poultices or Sinapisms.—The power of yellow mustard may be diminished, if desirable, by making the mustard up into a paste with vinegar instead of water. Few persons can bear a well-made mustard poultice much longer than from fifteen to twenty minutes, in the course of which time it will probably have acted sufficiently. Pure mustard should never be applied to the delicate skin of infants, who are much more easily acted upon by it than adults. For them equal parts of mustard and bread crumbs, flour, or oatmeal, should always be used, and the plaster should be kept on only until a red blush appears.

After a mustard poultice is removed, the part should always be dressed with some fresh lard, spread cold upon a linen rag, or a sheet of fine cotton wool may be placed over it. Nothing can be more soothing and agreeable to the feelings of the patient than this.

Mustard leaf has the advantage of being light, extremely easy of application, and free from the objectionable clammy feeling which accompanies the first few minutes after a mustard poultice has been applied.

N. B.—When mustard poultices are ordered to be applied to the calves of the legs, nape of the neck, or other part of a patient who is insensible, care should be taken to remove them in due time, because it has happened, under such circumstances, that in the confusion and hurry of the time, the poultices have been

left on until they have produced ugly sores and sloughs, from the effects of which the patient could with difficulty be rallied.

How to Apply Hot Bottles.—It is often of great importance that hot bottles should be very quickly applied to the hands and feet, and to the sides. In certain cases life itself may depend upon the quickness with which this is accomplished.

When a patient, after an operation, or in the course of an acute disease, is seized with a rigor or shivering, hot bottles should at once be applied. The ordinary old-fashioned stone foot-bottles, when enveloped in flannel, retain the heat for a considerable time. Their use, however, is sometimes superseded by bottles of india rubber, which are lighter, and much more easily managed. Hot bricks enveloped in flannel, or the plates from the oven of an ordinary kitchen stove, may be substitutes for hot bottles. They possess the advantage, after a hot fomentation, of being able to retain their heat longer, while they do not wet the patient's bed or clothes; but, on the other hand, there is an undoubted advantage in **warm** and **moist** applications. Bags of hot salt, or of hot bran, are often used instead of hot bottles. The salt or bran is to be heated in the oven, and put in a flannel bag previously warmed. This will be found to retain the heat for a long time.

A very good method of applying hot bottles, in order to check rigors which accompany febrile attacks, with dryness of the skin, and cold shivering, till the teeth "chatter in the head," is as follows: Several ordinary black bottles are filled with hot water, and put into the inside of woolen socks or stockings, which have been previously wrung out of hot water. These (two on each side) are to be placed alongside the patient, the bed clothes being protected by a dry flannel cloth. In a very short time the shivering will be checked, and the patient will be found bedewed with gentle perspiration.

How to Give a Child a Warm Bath.—A warm bath is very often ordered by medical men for children suffering from disease of the lungs, or other internal organs; but if the child is unnecessarily frightened, and exhausts himself by crying and struggling violently, owing to alarm at the preparations which are being made for what appears to him a frightful process, more harm than good will be done. The following piece of advice, therefore, to mothers and nurses, it is hoped, will be followed on all such occasions. First, prepare the bath out of the room, and out of the child's sight, so that he may not see it prepared in the room, and steaming frightfully as it seems to him. Secondly, after it is prepared, cover it over with a large flannel cloth, or with a suitable blanket, so as to hide the steam, and so prepared, bring it into the bed-room. If the child is very prone to alarm, and especially if this has been favored by his having been roughly bathed by his nurse on former occasions, it will be well to place him on the flannel cloth, and let him down gently into the water. A floating ball, of a pretty color, or a cork with colored feathers, may be given him to play with in the bath, and in this way, what is often made an object of terror, and is the means of doing injury instead of good, may be converted into a source of real pleasure to children, so much so, that when this plan is adopted they are more apt to cry at being taken out than at being put into the bath.

Fomentation is a simple and effective method of applying moist heat to any part of the body, by means of flannel wrung out of boiling water, or any other medicated hot fluid. It possesses advantages in many cases, and is to be pre-

ferred to poultices, as it is lighter and cleaner, and can be frequently repeated without much trouble. In extensive inflammations, especially of the abdomen, in erysipelas, and to allay spasms in deep-seated parts, as in cases of renal and biliary calculi (gravel and gallstones), repeated fomentations are always to be preferred to poultices. When moist heat is prescribed for inflammatory disease of the joints, or in rheumatic fever to relieve the articular pain, fomentations will be found serviceable. Much depends on the way in which the fomentation is prepared. It ought to be applied as hot as the skin can bear, and, although moist, the hot water should be thoroughly squeezed out of the flannel applied to the skin. A large piece of coarse flannel, folded, is employed for the purpose, and, after being soaked in boiling water, it should be enveloped in a coarse towel, and the hot water wrung out of the flannel by simply twisting the ends of the towel

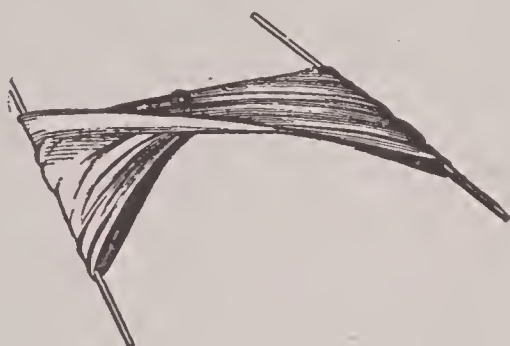


Fig. 319.

A way to wring out very hot cloths. Two sticks are put through the ends of a roller towel and used to twist it and so wring the hot cloths placed within it.

several times round the fomentation cloth. A very simple way of protecting the hands in wringing out the hot cloths is to take a roller towel, put a stick through each end with a fork or stick, lift the hot cloth out of the water and place it on the towel. This is then folded over it and by means of the end stick is twisted till the excess of water is wrung out. To retain the heat and the little moisture still remaining, it is advisable to apply a layer of dry flannel over the wet, and to envelop the whole with a piece of mackintosh cloth. If there is any danger of the fomentation slipping, a few turns of a bandage round the part will secure it. Solutions of opium, belladonna, aconite, or other narcotic substances, may be sprinkled over the fomentation flannel if it is desired to produce a soothing effect, or a few drops of turpentine as a counter-irritant. Poppy heads or chamomile flowers put in the hot water used may be soothing.

Friction, or rubbing a portion of the body, either with the hand or with some interposed material, is of much importance as a curative agent. Applied to the skin by means of rough towels, hair gloves, etc., it excites its nervous sensibility, and the circulation of blood through its capillary vessels. Friction with the hand in thickenings and congestion of parts beneath the skin is often of much service, and in none is its beneficial effect more obvious than where the breasts are painfully distended with milk after child-birth. In great emaciation from chronic disease, where exercise cannot be taken, friction, kneading, or shampooing of the muscles of the limbs is often of service to maintain their nutrition. The various oils, etc., used along with friction, are generally secondary to the rubbing effect, and are chiefly serviceable in facilitating the movement of the hand; some, however, are really beneficial; moreover, some, such as cod-liver oil, turpentine, etc., appear to exert a specific effect.—See Massage.

The Hot Douche.—It is sometimes necessary, in order to relieve the painful and troublesome affections of the joints and other parts, so common in chronic rheumatism and allied diseases, to employ the hot douche, or the hot douche bath: that is, to apply a continuous stream of hot water to the affected parts, either alone or accompanied by friction and percussion. The simplest and readiest method of effecting this is for the operator to stand upon a table or chair, with a jug or tea kettle, from which he allows a stream of water to fall upon the affected part, while, at the same time, another person hammers the part with a sock stuffed firmly full. A very high temperature (150 degrees Fahr.) can be easily borne; and, where desirable, as for instance, to an enlarged, painful and stiffened joint, the process may be continued for half an hour at a time.

The Cold Douche.—This is applied in exactly the same way as the hot, with modifications, and without the percussion being required in some affections of the joints, etc., in which it may be ordered by a medical man. It is desirable to use a strong stream of water, and to pour it from a good height; but when it is wished merely to apply cold to the head, as, for instance, in fever, or disease of the brain, or in the case of severe wounds of the scalp, a gentle stream of cold water only should be made to trickle over the patient's head. This may readily be done by means of a worsted thread (or several threads) dipped in a vessel arranged at a proper height. The patient's head and shoulders should be laid upon a waterproof cloth, so as to allow of the water flowing from it to a vessel placed at the foot of the bed.

Applying Cold to the Head.—Cold may be applied to the head by means of evaporating lotions, or by rags dipped in iced water, or by pounded ice in waterproof bags especially made for the purpose. Even skillful nurses, or what are at all events called skillful nurses, require to be constantly superintended, else they do more harm than good in this particular. For instance, they will take a large cloth dipped in cold water, fold it, apply it to the patient's head, and leave it there for an indefinite time, not knowing that it very soon becomes hot, and acts like a poultice, so that they are, in fact, applying heat instead of cold to the sufferer's head; perhaps, too, the patient is unconscious and unable to communicate his feelings to those around him. In order properly to apply either cold iced water or evaporating lotions to the head, a simple layer only of *thin* muslin or linen should be used, so as to allow of free evaporation, and this may be frequently changed, or it may be wetted without being removed from the head at all by squeezing a sponge or rag dipped in the lotion upon it.

The following cooling, evaporating lotion for the head may be used in fevers, inflammation of the brain, injuries to the head, etc.:

Take a solution of acetate of ammonia, three ounces; rectified spirit, two ounces; rose water, seven ounces. Mix. Or simple vinegar and water, or spirit of wine and water may be used; or a lotion made of sal ammoniac and nitre, of each, two ounces, dissolved in water, sixteen ounces.

To Apply Ice to the Head.—The ice should be pounded and placed in one of the india rubber pillows which are made for the purpose. When all the ice is melted, it should at once be renewed, as the water soon gets very hot.

N. B.—It is to be remembered that the long and continuous application of intense cold to the head may be followed by great depression of the vital power, and dangerous results, so that it should be done under the eye of a medical man.

Should the patient complain of the weight of the ice bag or bladder on the

head, a string may be passed from it to the ceiling, and brought down over a pulley, and tied so as to support part of the weight.

Poultice.—A poultice is an application adapted to afford moisture, and generally warmth, through the medium of some soft substance; or rather, it **ought** to afford these essentials, for, too often, cold dampness, or hardness and irritation, are the only effects from the ill-made and badly-applied poultices which ignorant people are apt to use.

Any soft substance which will retain heat and moisture, may be used to form a poultice, but some materials are better than others for the purpose. The substances most generally used are bread, linseed meal, oatmeal, charcoal, hemlock, yeast, etc., and combined with these numerous **antiseptics** are often employed, such as carbolic oil, solution of permanganate of potash or of chlorinated soda; bran, as a medium for applying heat and moisture, can scarcely be considered as a poultice properly so called. The mustard cataplasm is also sometimes called a poultice, but improperly. The name "cold poultice" is also used.

The essentials of a good poultice are, 1, that it shall be **perfectly smooth and free from lumps** or hardness; 2, that it shall be as **soft and moist** as possible without being sloppy; 3, that it must be **hot** as can be borne, and changed before it cools much; and, 4, that it shall have **sufficient bulk** to retain both its warmth and moisture, without being too heavy. No material, perhaps, is handier for making a good poultice than bread, and accordingly the

Bread Poultice is, perhaps, more commonly used than any other. It is made either with water or milk, but the latter is a very doubtful addition, and the same may be said of the grease or lard often added to this form of poultice. The milk is apt to turn sour, and can answer no better purpose than the water; and when a greasy poultice is used, the bread is not requisite. The best mode of making a bread poultice is to break the crumb of bread into a hot basin, pour boiling water over it sufficient to soak it thoroughly, and allow it to stand covered over for a few minutes by the side of the fire; any superfluous moisture being drained off, the pulp should be thickly spread upon a piece of cloth of the requisite size. In some cases it is advisable to interpose a piece of thin muslin between the poultice and the surface on which it is placed. The temperature at which a poultice is to be applied must vary according to circumstances, but generally the best is that which is most agreeable to the patient; occasionally it is useful to have it as hot as it can be borne. After a poultice is applied to the body, it is a good plan to cover it well, either with a fold of flannel or with oiled silk, to retain the warmth and moisture. The bad management of poultices generally constitute a serious objection to their use; they are often either made so sloppy as to wet everything around, and to put the patient in great risk from cold, or they are made so small and stiff as very quickly to become caked and hard upon the surface, particularly if not often renewed. Even in the most favorable circumstances, a poultice requires renewal at least three times in the twenty-four hours.

The cold bread poultice is often convenient, and is made simply with cold instead of hot water.

The bread poultice may contain a medicated application; thus, hot decoction of poppy "heads," etc., may be used instead of hot water or sugar of lead solution may be added to the cold poultice with advantage. The material used for

these medicated poultices should not, after use, be thrown where it can be picked up by poultry. After the bread poultice, probably the

Linseed meal poultice is more generally used than any other. For this purpose use ground linseed, free from grit. To make the poultice, a sufficient amount of boiling water is to be poured into a hot basin, and the meal stirred in till the whole is of the proper consistence; the mass, being beaten smooth before use, is then to be spread evenly upon the cloth. This forms a very smooth poultice when well made, and the oil, which the linseed naturally contains, tends to keep it soft. It is rather more stimulating than the bread poultice,—occasionally it is made, by mistake, of the whole seed instead of the meal.

The **oatmeal poultice** may be made in a similar way to the linseed, but, although oats contain a considerable amount of fatty matter, it is not sufficient alone to make an oily poultice like the linseed; it is, therefore, very common to add a little lard; this, however, must not be done when the oatmeal poultice is, as very generally it is made, the medium for the

Charcoal poultice, which is often applied to sores where there is much offensive discharge, and powdered charcoal is frequently sprinkled over the surface of common poultices to destroy fætor (bad odor). The charcoal poultice is made with half an ounce of charcoal, two ounces of bread-crumbs, one and a half ounces of linseed meal, and ten ounces of boiling water. The bread is soaked in the water for ten minutes, the linseed meal being gradually added and stirred till thick, after which one-half of the charcoal is to be added, while the remainder is sprinkled over the surface of the poultice when spread on lint or linen rag.

The **yeast poultice** has a reputation for absorbing and neutralizing fætor from wounds, especially in cases of gangrene. It is made with six ounces of beer yeast, fourteen ounces of flour, and six ounces of water, heated to a temperature of 100°. Mix the water with the yeast and stir in the flour, keeping the mass near the fire till it rises.

Other substances, such as carrots, turnips, etc., are often recommended and used as poultices, but they possess no advantage over those already named, and are objectionable from their smell.

In painful swellings, with inflammation, such as boils, in inflamed wounds, and the like, or for promoting the discharge of matter, no application is more suitable than the poultice. To the use of poultices, however, there is a limit, not always well observed—particularly in the case of wounds and ulcers. Up to a certain point they are most valuable, beyond it they do harm; instead of soothing and encouraging sufficient discharge, they attract the blood too strongly to the part, increase the discharge and encourage the formation of “proud flesh.” It is only practical experience which can teach the precise time when a poultice should be left off, but it may be guessed at, when healing processes, which have been going on favorably, seem to come to a standstill, or retrograde; when the discharge rather increases than diminishes, and the surface and edges of the sore seem to become full, and at the same time pale and flabby.

After poulticing has been carried sufficiently far, the simple water dressing is in most cases most suitable, it is cooler, pleasanter, and not so like a hotbed as the common poultice.

Enema, Injection, or Clyster, are all names for the same useful adjunct to medical treatment, the mechanical injection of fluid into the bowels by the rectum. Injections are most commonly employed as aperients, but they are also used as

anodynes, or antispasmodics, for the purpose of dispelling wind, or as internal fomentations, or as styptics. One of their chief uses is the administration of nutriment when the stomach is not available.

Nourishing injections are usually composed of strong beef tea with yolk of egg beat up in it, to which port wine or brandy may be added. As it is an object to retain the fluid in the bowel as long as possible, not more than three or four ounces should be given at one time, the operation being repeated every few hours.

In hemorrhage from the lower bowel, when it is proper to interfere with it, a two or three-ounce cold styptic injection may be used, made with sulphate of zinc, four grains, or sulphate of iron, one grain, to the ounce of fluid.

Aperient injections may be simply mechanical, of water, gruel, and the like, either cold, tepid or warm, or they may be medicinal. There is an objection to enemas of simple water, that in some cases they are apt to wash off the natural protecting mucus of the bowel, and therefore it is perhaps better, as a general rule, and where the remedy is often or habitually used, to employ a demulcent, such as gruel or barley-water. Ordinarily, to empty the bowel quickly, a quart of warm water, with two teaspoonfuls of table-salt dissolved in it, may be injected. The injection is best given with the patient lying on the back or side, with the hips higher than the shoulders. Cold enemas, sometimes useful, ought never to be resorted to except by medical direction; the fluid about the temperature of 90° will generally be found most appropriate, and when used simply, about a quart thrown up slowly, will be found a suitable amount for adults. Some use a much larger quantity, as much as two or three quarts; this, in certain cases of illness, may be a useful measure, but as a habitual thing is bad; the frequent over-distention with so large a quantity of warm fluid produces want of tone, which aggravates the torpid tendency of the bowels, and favors fecal accumulation. For a child of six years of age, half a pint of simple gruel injection is ample. These simple enemas act by stimulating the bowel by their mechanical bulk; when a medicinal injection is used, or when food such as beef tea is given by the rectum, the object is in some degree to avoid this, so that the agent may not be expelled before it has time to exert its peculiar agency. The medicinal or nutritive injection ought, therefore, not much to exceed one-half the quantity of the simple one.

The simplest and readiest medicinal enema is made either with a tablespoonful of common salt in a pint of gruel, or with a piece of brown soap, the size of a hazel-nut, rubbed down into a pint of warm water; or instead of these, from half an ounce to an ounce of Epsom salts, or two ounces of olive oil, or half that quantity of castor oil; or infusion of senna, half an ounce of leaves to the pint, may be employed.

Anodyne injections ought always to be so small in bulk—not exceeding three fluid ounces—so as not to stimulate the bowel to expel them, which, from the nature of the cases in which they are usually given, it is apt to do. The best form is from fifteen to twenty-five drops or more of laudanum in three ounces of moderately thin starch. This enema is, of course, to be retained in the bowel if possible. One of the most useful injections for flatulence is made with two drachms of tincture of asafetida to half a pint of gruel, to which, if there is much pain, ten or fifteen drops of laudanum may be added; or the same quantity of asafetida tincture may, if required, be added to an aperient injection. Injections used for internal fomentation may be given to the amount of a quart, and of a temperature of 98° or 100°.

INSTRUCTION SIXTY-FOUR—*Helpless Patients*

Complete Instructions

on

How to Nurse, Assist, Lift, Move and Feed Helpless Patients

Causes of Helplessness—Lifting and Laying—Changing Sheets—The Draw-sheet—
Remaking Bed—Raising Patient—Feeding—The Bedpan and Urinals—Bedsore.

Patients may be helpless from any of the following causes:

1. Injury, such as fracture or burn.
2. Disease, especially if causing paralysis.
3. Weakness in any condition.

Patients suffering from weakness, or patients who have been in bed a long time, have a great tendency to faint when placed in the erect position, as that lessens the amount of blood going to the brain; therefore in lifting and laying helpless patients it is important to keep them as nearly horizontal as possible.

To Lift and Lay a Helpless Patient.—Any of the following methods may be adopted:

First Method.—Two attendants place themselves one on each side of the patient, and, stooping, each passes one hand under the patient's back, just below the shoulder-blades, and the other hand under the thighs, close to the hips. They now interlock their hands, and steadily rise together, lifting the patient. Should there be a fracture, a third attendant should support both extremities by placing his hands above and below the seat of the injury.

Second Method (with Captain Russell's stretcher).—This consists of two poles, connected together by strips of webbing and two cross-bars.

The stretcher is laid by the side of the patient, and the pole nearest him is removed; the looped ends of the webbing are passed under the patient, the pole that was removed passed through the loops again, the cross-bars fixed, and the patient lifted by two attendants as if on an ordinary stretcher.

Third Method.—Two poles 6 feet long are placed one on each side of the patient; the under sheet and the blanket covering him are rolled firmly round the pole on each side and secured with several pins. Two attendants now place themselves on each side and face the patient, and grasp with one hand the end of the pole and with the other hand the center of it, and steadily lift the patient.

Fourth Method.—A blanket is passed beneath the under sheet beforehand; the blanket and sheet are raised by their edges at each side above the patient, allowed to meet in the center, and rolled from above downwards, till the roll meets the patient's body. Two attendants can now take hold of the roll in different parts and lift the patient. If a stick is placed into the center of the roll, it is easier to keep it extended, and the ends of the pole may serve as handles.

Changing Sheets.—To change the **upper sheet**, proceed as follows:

Take off the topmost blanket, and untuck the rest of the upper clothes; now spread a clean sheet over the bed, and cover it with the blanket which has been removed. One assistant now stands at the head of the bed, or the patient himself if he is able to help, and takes hold of the clean sheet and blanket firmly with both hands, while another assistant draws off the dirty sheet and the other upper clothes from the bottom of the bed, taking care in doing so not to expose the patient. One person alone can change the sheets by standing at the side of the bed and holding the fresh sheet with one hand while he pulls the soiled clothes down to the foot, under the fresh sheet and blanket.

If the bottom of the bedstead has a high footboard, the sheet can be changed from one side instead of from the bottom.

To Change a Lower Sheet—First Method.—Turn the patient gently on one side, loosen the soiled sheet all round, roll it up at one side lengthways until half of it forms a roll just against the patient's back; now take the clean sheet, taking care that it has been well aired and warmed, make a longitudinal roll of half of it, place this roll against the roll of the dirty sheet, letting the fresh sheet take the place of the soiled one; turn the patient gently over the two rolls, take away the dirty sheet and unfold the clean one, and tuck it all round under the mattress.

Second Method.—Suitable for surgical cases, where splints or other apparatus have to be kept in position.

Gently raise the patient into a sitting posture, loosen the dirty sheet and roll it from above downwards close up to the hips of the patient; now take the clean sheet, roll one half of it crossways, and

place the roll next to the roll of the dirty sheet, spreading the rest of the clean sheet under the pillow and the part of the bed from which the dirty sheet has been removed; lay the patient down, raise the hips and lower extremities, remove the dirty sheet and unfold the clean one, and tuck it well round under the mattress.

The Draw-sheet.—This is required in surgical and other cases to prevent the lower sheet from being soiled.

It is made by taking a large cotton sheet, folding it lengthways into four, and placing it across the bed, so that it shall reach from just below the patient's shoulders to his knees; a piece of mackintosh or oil-cloth should be placed between the draw-sheet and the under sheet, and the draw-sheet should be 4 to 6 inches wider than the mackintosh.

A draw-sheet requires to be frequently changed in order to bring a fresh part under the patient as soon as one part becomes soiled; this is done by slightly raising the patient and drawing a clean part of the sheet under him, taking care to roll up the soiled part and pin it.

To change the sheet altogether, proceed as follows:

Pin the edges of the clean and dirty sheet together; one attendant now raises the middle of the patient's body, while another attendant draws the dirty sheet through till the clean one is under the patient. If the patient is too heavy to lift, the draw-sheet may be changed in the same way as the under sheet.

To Remove a Bed for a Helpless Patient.—First prepare a second bed, and place it by the side of the one on which the patient is lying, but at a sufficient distance from it to allow the attendants to move freely between the two beds; then carry the patient by one of the methods described above for lifting, and place him in the new bed.

To Raise a Helpless Patient in Bed.—This should be done by placing a series of pillows sloping upwards under the patient's back and head, and not by merely placing several pillows under the head. If the bed has a head-lift, the patient can be raised by this; or a head-lift working by a rack and pinion can be placed under the mattress. Or a common kitchen chair may be turned upside down and placed under the patient's pillows. To prevent the patient from slipping down when raised, place a footboard with a pillow against his feet, or place an air or water pillow under his hips, and tie it by two tapes to the sides of the bed.

To Feed a Helpless Patient.—Pass the left hand behind the pillow, and raise the head and pillow together. For fluids, use a feeding-cup

or a glass or mug, but only half fill them, otherwise the fluid will spill; or a spoon may be used.

Fig. 320.

An invalid's cup, to give a drink or liquid food without raising the head. Instead of this may be used an ordinary cup and a bent glass tube. The latter is about as thick as a lead pencil, 6 or 8 inches long, and about one-third of it is bent at an obtuse angle.



While the patient is being fed, a clean towel should be placed under the chin, and the mouth should be wiped when the feeding is finished.

The Bedpan for Helpless Patients.—Bedpans should be made of earthenware, as they are the cleanest and best. The graniteware are also very serviceable. There are two kinds: The circular, for men; and the slipper, for women.

Before using a bedpan, thoroughly warm it, place some disinfecting powder in the bottom, and for a very helpless case rub the edges slightly with oil.

A round bedpan before use should have a pad of cotton-wool, soaked in some disinfectant, placed on the open handle.

In order to use the circular bedpan, the patient should be raised by two or three attendants in the manner described above and the pan slipped under; or the side of the body may be slightly raised, and the pan slipped under that way. Or pillows may be placed under the small of the patient's back to raise him.

In order to pass the slipper-pan, the patient lies on her back, draws her knees well up, and the pan is then slipped under from in front.

When the pan is removed, it should be either placed in some receptacle provided for it, or covered with a duster wrung out of some disinfectant.

Urinals.—Special urine-bottles should be used for males, and they should be of such a form as to prevent the urine from flowing back into the bed.

After bedpans and urinals have been emptied, they should be disinfected with carbolic solution (1 in 20), thoroughly cleansed with hot water by a bottle-brush or mop, and wiped quite dry.

Bedsore.—These are the result of long continued pressure and lack of cleanliness of the skin, together with either lowered nutrition or bad nursing.

In washing and dressing patients, signs of approaching bedsores, indicated by redness of the skin, should be carefully watched for.

To prevent bedsores, the following points should be attended to:

1. The bed should be carefully and smoothly made. In chronic cases the patient may with advantage be placed from the first on a water-bed.

2. Continuous pressure should be avoided on all parts which are liable to become sore, such as the hips, back of spine, etc. This can be done by shifting the patient's position from time to time, turning him on one side, then on the other and again on the back.

3. The parts liable to pressure should be either kept well washed and dusted with violet powder or boracic acid; they should be bathed from time to time with 70 per cent alcohol (rectified spirits diluted with a little water), spirits of wine, eau-de-Cologne, or brandy; or the parts should be covered with protective adhesive plaster spread upon chamois-leather or felt.

INSTRUCTION SIXTY-FIVE—*Fever Patients*

Care of Fever Patients

Slight, Moderate, High and Very High Fevers.

The Course and Termination of A Fever.

Definition—**Varieties**—**Course and Termination**—**Acute Infective Fevers**—**Spread of Infection.** *Precautions:* Isolation—Disinfection—Quarantine—Special Points in the Nursing of Fevers—Small-pox—Chicken-pox—Measles—Mumps—Diphtheria—Scarlet Fever—Typhoid—Typhus.

Definition.—Fever may be defined as a more or less continued elevation of the temperature above the normal (98.4° F.). Fever is said to be:

- (i) **Slight**, when the temperature is below 101°.
- (ii) **Moderate**, when it is between 101° and 103°.
- (iii) **High**, when it is between 103° and 105°.
- (iv) **Very high**, or **hyperpyrexial**, when it continues above 105°.

Varieties of Fever.—1. **Continued**, when it runs a prolonged course with little intermission.

2. **Remittent**, when it fluctuates every day, but does not regain the normal until the disease is at an end.

3. **Intermittent**, when there is an interval of some duration, in which the temperature remains at the normal, between the periods of fever.

4. **Hectic**, when the fever is remittent and is associated with profuse suppuration, as in abscess formation.

5. **Relapsing**, when, after a continued elevation of temperature, there is a fall and apparent recovery, which is again succeeded by another rise.

The Course and Termination of a Fever.—In every attack of fever the following stages are present:

1. **The Stage of Invasion.**—In this stage, which is also called the Cold Stage, the patient feels cold and chilly, and generally there is more or less severe shivering, or **rigors**. The internal temperature is raised, though the skin may continue to be cold, and there is more or less headache and depression. The pulse is hard and small.

2. **The Stage of Acme** (or the Hot Stage).—Here the pulse is full and bounding, and the surface of the body becomes hot.

3. **The Stage of Defervescence** (or Decline).—Here there is more or less free perspiration; the temperature falls, and the pulse is softer and less full.

The stage of defervescence may come on in one or other of the following modes:

(i) By **crisis**, in which there is a rapid fall of temperature, generally in the course of a few hours, and a great increase in the various excretions—profuse perspiration, free flow of urine, watery diarrhea.

(ii) By **lysis**. Here the fall of temperature is slow and regular, taking a few days to regain the normal height, and there is no appreciable increase in the excretions.

(iii) Combination of crisis and lysis. Here there is at first a rapid fall of temperature down to a certain point, and then a more gradual lowering.

(iv) Irregular. Here the course of the fall of temperature is quite irregular.

The Acute Infective Fevers, and Their Management.

The following fevers, viz., small-pox, chicken-pox, measles, German measles, mumps, whooping-cough, diphtheria, scarlet fever, typhoid (or enteric) fever, and typhus fever, are communicable from

The Acute Infective Fevers.

<i>The Acute Infective Fevers.</i>	<i>How Infectious.</i>	<i>Period of Incubation.</i>	<i>Quarantine to be required after Last Exposure to Infection.</i>	<i>Shortest Period of Isolation after an Attack.</i>
1. Small-pox— Variola.	Through the exhalations from the lungs and skin, the secretions and excretions of the body, and by fomites. The vesicles, pustules, and scales are highly infectious.	By infection, 14 days; by inoculation, 9 days.	18 days.	Until all scales have fallen off and the skin is smooth.
2. Chicken-pox— Varicella.	Through the exhalations and by fomites.	10 or 12 to 15 or 19 days.	18 days.	Ditto.
3. Measles—Morbilli, Rubeola.	Through the exhalations, especially the breath, and by fomites.	8 to 10 days.	16 days.	3 weeks, if all desquamation, cough, discharge from ears and eyes, have then ceased.
4. German Measles— Rötheln.	Through the exhalations.	10 or 14 to 17 or 21 days.	16 days.	3 weeks.
5. Mumps—Idiopathic Parotitis.	“ “	14 to 21 days.	24 days.	4 weeks, if no swelling of the glands remains.
6. Whooping-cough— Pertussis.	Through the exhalations, the secretions of the nasal and respiratory mucous membrane, and by fomites.	14 to 21 days.	21 days.	6 weeks, if all spasmodic cough or whoop has ceased.
7. Diphtheria.	Through deposit on the throat, through the breath and the excretions.	3 or 4 to 6 or 8 days.	12 days.	3 weeks, if convalescence is complete, and there is no chronic discharge from any mucous surface, and no sore throat or albuminuria. Or better, until the diphtheria germs are no longer present in the throat, as determined by a bacteriologist.
8. Scarlet Fever— Scarlatina.	Through scales from skin, the breath, and by fomites.	3 to 5 or 6 days.	14 days.	6 weeks, if desquamation is complete and there is no sore throat.
9. Typhoid Fever— Enteric Fever.	Through the excreta from the bowel and kidneys.	11 to 14 or 21 days.	21 days.	4 weeks.
10. Typhus Fever.	Through the exhalations of the skin and lungs, and by fomites.	9 to 12 days.	21 days.	4 weeks, if convalescence is complete.

person to person, and are therefore termed the "acute infective fevers."

Spread of Infection.—Infection may be spread from these in the following modes:

(i) By the **breath** in small-pox, measles, whooping-cough, mumps, typhus and scarlet fever.

(ii) By **exhalations from the skin** in typhus fever.

(iii) By **desquamated particles of epidermis** in scarlet fever, and of pustules in small-pox. These may be carried by currents of air.

(iv) By **secretions and excretions**—mucus from the throat and mouth in diphtheria and scarlet fever, the bowel excreta in enteric fever.

The infection may be **conveyed**—

(i) By the **air**, as in small-pox and typhus, the poison being then inhaled.

(ii) By **water**, as in enteric fever.

(iii) By **milk**, as in enteric fever, diphtheria, scarlet fever.

(iv) In **fomites**, i. e., infected clothing or other articles, such as toys, books, etc.

(v) By **direct contact**.

The acute infective fevers are characterized by having a latent, or incubative, period intervening between the infection and the appearance of the first symptoms of the disease (and termed the "period of incubation"), and by the appearance in most cases of a distinctive rash, the date when this rash appears being within narrow limits pretty constant for each disease. The stage following incubation, when the first symptoms appear, is termed the "onset."

The rash usually appears: 1. In smallpox, on face and forehead, 2d or 3d day; 2. In chickenpox, on body and shoulders, 1st to 4th day; 3. In measles, on forehead, on 3d or 4th day; 4. In German measles, the same; 5. In scarlet fever, on body, 2d day; 6. In typhoid, on body, end of 1st week; 7. In typhus, on sides and back, 5th to 8th day.

Precautions to be Observed in Order to Prevent the Spread of Infection.

1. Isolation of the patient.
2. Disinfection.
3. Quarantine.

Isolation of the Patient.—Removal of the patient to an isolation hospital is the most efficient method, but failing this, home isolation must be effected.

Arrangement of the Sick-Room.—The patient should be kept in one or more rooms, preferably at the top of the house, or in a detached wing, and these rooms should be set apart exclusively for his use. A fire should be kept burning in the room for the purpose of ventilation and in order to destroy waste material. Fresh air should be admitted into the room in abundance by means of the windows or other ventilators, but, at the same time, the patient should not be exposed to any draughts. The door of the room should be kept shut, and a sheet may be hung outside the door. The room or rooms should before occupation by the patient be stripped of all unnecessary furniture, curtains, carpets, or woollen material likely to retain any particles of contagion. No one except the nurse in actual attendance should be permitted to enter the room; and she should not leave the room without first washing her hands in carbolic solution (1 in 40) and changing her outer garments just outside the door of the sick-room. There should, if possible, be two beds in the room side by side, and the patient should be lifted from one to the other every other day or two, but this should not be done without the doctor's orders. No food should be taken out of the sick-room, nor any clothing or utensils, without previous disinfection; and the air of the room should be kept sweetened by the moderate use of Sanitas, thymol, or some other deodorant, either in the form of a spray or solution exposed in open dishes, or sponged on the floor, etc. A separate sleeping-room should be provided for the nurse, and she should avoid all unnecessary intercourse with the household.

(See also "Hygiene of the Sick Room.")

Disinfection.—The object of this is to destroy the particles of contagion thrown off by the patient.

a. **Disinfection During Illness.**—To effect this the following rules should be attended to:

1. There should be an abundant supply of disinfecting solution, either perchloride of mercury (1 in 1,000) or carbolic acid (5 per cent.) See standard disinfectants.
2. The floor of the room should be cleaned every day, and sprinkled with the disinfecting fluid.
3. All the secretions and the excreta from the patient should be passed into vessels containing an equal bulk of the disinfecting fluid, and before removing them more disinfecting solution should be added.
4. Old linen should be used instead of pocket-handkerchiefs, and should be burnt as soon as soiled.
5. All the bed and body linen after use and before leaving the

room should be left to soak for at least an hour in the carbolic solution; they should then be boiled in water, wrung out, and exposed to dry.

6. All the utensils should be placed in the disinfecting solution, and then washed in warm water.

7. The patient's body should be kept scrupulously clean; the bed should be ventilated during the day. If scales or crusts form upon the body, it should be rubbed with carbolized oil or vaseline (1 in 60) to prevent the contagious particles from being scattered about.

8. The water-closet should be frequently disinfected; its window should be kept open, and its door closely shut. The covers of bed-pans should also be thoroughly disinfected.

9. The nurse attending the patient should be of mature age, or should have already had the disease from which the patient is suffering. Her dress should be of cotton, or of a material that can be easily washed. She should avoid as much as possible inhaling the patient's breath, the emanations from his skin, or other discharges, before taking her meals, which she should have regularly, as well as periods of rest and fresh air. She should carefully wash her hands in carbolic solution after contact with the patient.

10. If visitors have to be allowed into the room under exceptional circumstances, they should be made to conform to the rules observed by those in attendance. They must avoid touching anything in the sick-room, and must wash their hands in a disinfecting solution before leaving.

b. **Disinfection After Illness.**—After the patient has become convalescent, he should not be allowed to leave the sick-room without the doctor's permission. Before leaving he should have a warm bath, his skin being well sponged with carbolic solution (1 in 40), then in plain water, and should then be dressed in clean clothes.

All linen, cotton and silk articles which can be removed should be boiled for ten minutes.

The blankets, woollen materials, beds, pillows, mattresses (including spring, or these may be thoroughly wiped off with a strong carbolic solution, 1 in 20), curtains, hangings, carpets, rugs, etc., should be removed and disinfected by steam, or by hot air in default of steam.

All materials which cannot stand boiling should be spread out and hung upon lines fastened across the room, and fumigated by sulphurous acid or chlorine or formaldehyde as indicated below.

While the room is being fumigated, all the furniture that has been in use should be left in it.

After the fumigation is complete, all the articles in the room should be taken out into the open air, and brushed, washed, or beaten.

The windows and doors of the room should then be thrown open. The windows, ceiling, floor, and all surfaces (particular attention being paid to corners), must be well swept or washed; the paper should be stripped off, the ceiling and walls whitewashed; the walls may then be papered.

After the nurse has ceased attending to a fever patient, she should not mix with others till she has had a warm bath and put on clean clothing.

Fumigation.—This can be effected either by sulphurous acid, by chlorine, or by formaldehyde.

Before fumigation, the room should be rendered as air-tight as possible: paper should be pasted over the fireplaces and ventilators, and around the window-sashes and doors, leaving, of course, one door from which the operator quits the room; this is to be pasted up from the outside.

To fumigate with sulphur, take 3 pounds of sulphur to every 1,000 cubic feet of air space, break the sulphur into small pieces, put it in an iron dish, set the dish on a brick in a pan of water placed in the center of the room, and set the sulphur alight by means of a few live coals, or by a spoonful of alcohol poured on it and lighted. See also under consumption.

To fumigate with chlorine, take 15 pounds of chloride of lime and 22 pounds of hydrochloric acid for every 1,000 cubic feet of air space, divide the reagents into several portions, place the chloride of lime in earthenware vessels in several parts of the room, and add the hydrochloric acid to each portion.

To fumigate with formaldehyde, stretch a clothesline across the room, throw a bedsheet or tablecloth over it and with a coarse sprayer, syringe or sprinkling can wet the sheet with 6 ounces of formalin for each 1,000 cubic feet of space in the room. The formalin will whiten varnish or paint on which it falls. It does not soil or injure the sheet on which it is sprayed, nor does the gas injure anything except plants, which must, therefore, be removed. A better way is to put permanganate of potash (2 pounds per 1,000 ft. of air-surface) in a pail (after sealing up the room as above described) then pour on it the formaldehyde.

During fumigation the room should be kept closed for at least twenty-four hours.

Quarantine.—Persons who have been exposed to infection should be kept under quarantine for at least the specified time indicated above for each infective fever; and it is particularly important that during the quarantine period no children from the house should be allowed to attend school.

Special Points in the Nursing of Fevers.—1. **Small-pox.**—The nurse selected should be one who has either had small-pox or has recently (i. e., within five years) been successfully vaccinated. The patient should be kept in a large, well-ventilated room and isolation rigidly enforced. He should be well sponged every day with tepid water, and after drying, his body should be anointed with carbolized oil (1 in 60).

The condition of the eyes should be watched, as pustules may form upon the conjunctiva. If there is much irritation of the eyes, a drop of castor-oil may be inserted into the eye every morning. The face may be dusted with starch or zinc powder.

If the scabs are hard or offensive, a bread or charcoal poultice may be applied to loosen them and allow the matter to escape.

2. **Chicken-pox.**—The child should be prevented from scratching or picking the vesicles, especially those on the face, as a scar is almost sure to result from the infection caused by scratching.

He should be isolated from other children, and kept on a light diet.

The disease usually runs an extremely mild course.

3. **Measles.**—Children suffering from measles should be clothed in flannel, placed in bed at once, and carefully protected from all draughts of cold air, in order to avoid bronchitis or pneumonia.

Convulsions sometimes occur; the patient should then at once be placed in a warm mustard bath.

Attention should be paid to all complaints of earache, and any discharges should be noticed.

During convalescence particular precautions against catching a chill should be taken.

4. **Mumps.**—The patient should be confined to his room, his face and neck protected by cotton-wool or soft flannel. If there is pain, hot fomentations are to be applied. The diet should at first be light, and as debility very often follows an attack of mumps, care should be taken during convalescence to avoid chills, and to give a generous diet and a tonic medicine.

5. **Diphtheria.**—The patient should be placed in a well-ventilated

room, warmed to a temperature of about 60° F. The diphtheria antitoxin should be given as early as possible and in sufficient amount to neutralize all the poison. The nurse and other members of the family should each have a prophylactic (i. e., preventive) dose. This is a sure cure if given soon enough and in large enough doses.

All secretions from the mouth and nose should be wiped off with pieces of rag, and the pieces burnt. The nurse should avoid inhaling the patient's breath, and should be particularly careful that she does not get any particles of membrane, etc., on her lips. She should disinfect everything in the room thoroughly.

In severe cases nourishment will have to be frequently administered, to support the strength of the patient.

Children must be carefully watched at night for any symptoms of implication of the larynx, such as difficult breathing, and the surgeon immediately summoned should they appear.

Sudden death from cardiac failure very often occurs in diphtheria; therefore, if there is much prostration or a tendency to faintness, the patient should be kept in bed, and not allowed to get up.

The urine should be saved for examination by the doctor.

During convalescence great care is necessary to prevent any tendency to cardiac failure; violent exercise for some months after an attack should be altogether prohibited.

6. **Scarlet Fever.**—If there is severe sore throat or much difficulty in swallowing, pieces of ice may be given to suck, or steam may be inhaled from a pitcher of hot water.

If there is much depression, stimulants may be required.

The disease sometimes attacks the joints; if this happens, the joints should be wrapped in flannel or cotton-wool.

During convalescence, in the third and fourth weeks, a careful watch should be kept upon the urine—with regard to its amount and color. If the skin under the eyes becomes puffy and the ankles swell, they must be brought to the notice of the doctor, and some urine also saved for examination.

Cold and chills should be avoided by keeping the patient in bed, or in a comfortable room. The bowels should be kept freely open, and the diet restricted, meat, beef-tea, and eggs being avoided.

Desquamation, or peeling of the skin, should be looked for. It sometimes lasts for six or more weeks after the fever, and while it continues the patient should have a warm bath every day, carbolic soap being used, and after the bath his body should be anointed with carbolized oil.

7. **Typhoid Fever.**—This fever runs an extremely protracted course, and a successful issue depends in a very great measure upon careful nursing.

The patient should from the first be put to bed, after receiving a warm bath, or, if too ill for this, a warm sponging.

He should be kept absolutely quiet in bed, lying down; and during the middle and later periods of the disease he should be moved on the bed with extreme care, as perforation of the bowels has been known to occur by the patient suddenly sitting up.

(i) **Diet and Feeding.**—In typhoid fever there is great emaciation and prostration; the patient therefore requires constant nourishment.

In mild cases, where a good deal of nourishment can be taken at a time, it may be given every four hours.

In severe cases, with prostration and stupor, 2 or 3 ounces of nourishment may be given every hour or two by means of a feeder or spoon.

In these cases there is very often a loathing for milk; the tongue is dry and brown, and there are very often crusts upon the lips; the mouth, tongue, and lips should therefore be frequently cleaned with lemon-juice and glycerin or water.

Milk is the best diet. Two to five pints should be given in the twenty-four hours, freely diluted with water, barley-water, or soda-water. If milk be disliked or not digested, light beef-tea, veal or chicken broth, and eggs beaten up, may be given, or koumiss or peptonized milk; coffee and milk, and iced water may also be given.

If there is great prostration, nutrient enemata of milk, brandy, and port wine may be required.

In ordinary cases stimulants are not required; in severe cases stimulants are needed, and the quantity to be given will be indicated by the doctor.

In the fourth week, when the patient is beginning to feel better, there is a great craving for solid food; but the nurse must in no way alter the patient's diet till she receives instructions from the doctor to do so, and she must see that the friends of the patient do not give him anything solid to eat. **Solid food given during this period may lead to perforation of the walls of the intestine, and cause death!**

(ii) **Sleep.**—This must be distinguished from stupor. If the patient is sleeping, he should be allowed to do so for four or five hours at a time, and not be aroused to take nourishment.

If he is in a state of stupor, he should be aroused at intervals to

take nourishment. To induce sleep a small dose of alcohol may be given, or the body sponged with tepid water.

(iii) **Diarrhea.**—Several motions in the twenty-four hours are natural; eight or nine a day are excessive. Here an enema of starch and opium will have to be given, and beef-tea avoided. If there is milk-curd in the stools, give less milk.

(iv) **Constipation.**—Here an enema of castor-oil may be administered, but aperients by the mouth must be avoided.

(v) **The Motions.**—These are highly infectious; therefore they should be immediately disinfected with carbolic solution (1 in 20), into a quantity of which they should be passed. Old linen or tow should be used to clean the patient, and should at once be burnt, and the nurse should also well wash her hands in weaker carbolic solution (1 in 60), or in corrosive sublimate solution, 1 part in 1,000 of water.

(vi) **Hemorrhage from the Bowel.**—If this occurs the doctor should at once be informed, and in the meanwhile stimulants should be withheld and the patient given ice to suck and kept absolutely quiet.

(vii) **Peritonitis.**—This may be due to perforation of the bowel, in which case collapse soon comes on, indicated by great pallor, cold sweats, feeble pulse, and syncope.

(viii) **Plugged Veins of the Leg.**—Here the patient should be kept lying down, and the leg raised and wrapped in cotton-wool.

(ix) **Retention of Urine** sometimes occurs, and should be reported to the doctor.

(x) **Distention of the Bowel** also frequently happens and the abdomen may be drum-like. Place a broad flannel roller (or band that will lap over at the ends when around the patient) under the patient, then, on the patient's abdomen, lay a double layer of thin flannel wrung out of very hot water to which a teaspoonful of turpentine has been added. This is a "turpentine stupe" and it should be repeated.

(xi) **Convalescence.**—After the temperature has become normal, it should be taken for at least a fortnight morning and evening, as a relapse often occurs; if so, the diet must be again fluid. In any case of typhoid no solid food should be given until the temperature has been normal for at least a week.

8. **Typhus Fever.**—There should be free ventilation. The patient's breath should be avoided as much as possible. Great care must be taken to prevent bedsores, and in severe cases stimulants will have to be freely given.

Presence of Mind and Self Control While Waiting for the Doctor

The Physician's Orders Should Be Explicitly Followed.

Keeping Quiet in Emergency.

Some time ago a man met an accident and cut his wrist with a piece of a broken jug. Although residing in one of the largest cities in the world, surrounded by thousands of people, the largest hospitals, and the best doctors, yet he was allowed to bleed to death, and his wife had to stand trial for murder, all this for the want of a little knowledge and common sense used at the proper time.

The occurrence shows well the need of a few hints and instructions as to what is best to do in case of accident or sudden illness, especially by those who live at a distance from a surgeon. But no one can always foretell whether an illness or an accident will prove serious or not. Therefore, what is here given is not to take the place of the advice or care of a doctor, but to show people how to employ the time profitably while they are waiting for the doctor. As he never comes till he knows he is wanted, the first thing to do is to send for him; and let us consider what to do while the messenger is away.

Suppose an accident has happened, what are the first things we want? **Presence of mind, self-control,** and the power of **keeping silent** when it is best to do so. There is no worse hindrance to the doctor than persons who, just at the time when their services are most needed, begin to scream, run wildly about, get in every one's way, hinder other people, are not able to give a sensible answer, perhaps faint, or go into hysterics, or pretend to do so.

Of course all have not the same gifts; all have not the same "strength of nerve." Most people have naturally a dread and feel nervous horror at the sight of blood. This is quite natural, for blood always suggests suffering or death. Much, however, can be done by force of will, determination, facing the thing bravely. This does not mean that we should be hard-hearted and feel or show no sympathy with our fellow creatures when they are suffering. But a determination to conquer one's self, in plain language **to make one's self go through it**, will enable timid people to be courageous. Some ignorant people say that a doctor has no feeling for his patient, but they know little of the truth. Ask those who live with doctors and know them, and who hear their remarks about the painful operations they have

had to perform, and how nobly the poor patients bore it. Ask Florence Nightingale and the noble women who, without pay or reward, attend in the dwellings of the poorest of the poor, and who witness and dress every kind of wound and accident. Almost every kind of loathsome disease is nursed by these tenderly brought up ladies—accidents by machinery tearing the body frightfully, accidents by fire, where not only is the poor sufferer an awful object, but where the peculiar sickening smell of burnt flesh seems to cling to the person and clothing for days afterwards. Do not these women suffer when others are in pain? Yes, truly; but they have taught themselves to overcome their feelings. Let us conquer ourselves, be calm when accidents happen or sudden illness comes on, and so be useful to others in their distress.

There is a wonderful difference in the way in which pain affects people. An injury which is borne by one with scarcely a word of complaint, forces another to cry out and writhe about. A man accustomed to labor in the open fields, or any person taken suddenly from an active life, must not be expected to bear confinement to bed, or even to one position, as well as another who has been employed at an indoor occupation. Nurses and friends should bear this in mind, and avoid being made cross or impatient by it. Scarcely ever does a healthy sailor come into hospital with a broken limb who does not manage to kick off splints, bandages, and so on, regularly, the first few nights. But in a short time he becomes quiet and accustomed to the confinement.

On the other hand, let all who have to suffer keep in mind a few simple facts. When they give way to the pain and their feelings, they add greatly to the distress and confusion of those who are with them; they very much hinder their own recovery, and when the pain is over they regret not having been braver. It is indeed wonderful what can be borne when a person makes up his mind to "grin and bear it," as soldiers say. How any one could possibly bear up under slow cutting operations or accidents without the use of an anesthetic, is a marvel. A curious instance of this occurred some years ago, before chloroform was invented. A large, well-made, healthy seaman was brought into the hospital with his leg so terribly crushed that it was necessary to take it off some distance above the knee. The doctor said to him, "Jack, I am very sorry to have to tell you that the only thing which can be done with this unfortunate leg is to take it off; we cannot save it; you know we cannot splice it or fish it like a mast."

"No," he replied, "I can see that; well, it must be done, it'll never

be seaworthy any more; how long will you take doing it?" So he was told only a very short time was necessary. "Oh, well," he said, "cut the wreck adrift, and fit a timber one. I'll bear it."

And the limb was taken off without one groan or one word of complaint. But as the house surgeon was fastening on a bandage he accidentally pricked the sailor with a pin, and the latter immediately cried out, "Hello, Mr. Surgeon, the point of that marlin'-spike's rather sharp; that's too bad."

The doctor said, "Why, Jack, how is this?—you bore having your leg taken off like a brave fellow, as you are, without saying one word, and now, when only the point of a pin touches you, you call out."

"Ah, sir," he said, "don't you see: **I made up my mind** to have my leg cut off? I told you I'd bear it, but I made no bargain about the pin-sticking business."

This is a most excellent example of what is meant by "making up the mind to bear it." But, alas! we poor men do not as a general rule bear pain well; we are used to an active, busy, out-of-door life; so we are apt to be cross when suffering or compelled to be still, and often we need a good deal of coaxing and petting to behave properly; yet if we meet with any accident to which our occupation makes us liable, let us bear in mind that the most terrible accidents, which tear the flesh in pieces, are not the most painful. The larger the surface burned or scalded, the less may be the pain, especially if the burn is deep, and the diseases which cause the greatest suffering are not always the most fatal.

Pain is always the result of something wrong either in mind or body, and though it is hard to bear, it is not entirely an evil. It is really a merciful provision to warn us of danger, or to tell us that we are committing some error. Thus if a child puts its hand into the flame of a candle, the pain makes it snatch it away quickly, before it has time to do serious injury. A person using a knife, and cutting into his finger, is instantly warned to stop, for he is doing harm.

One other remark is addressed particularly to husbands. When you are in pain and feel inclined to be cross, look at your wife, or, if not married, look upon your mother, and reflect that each time a child was borne by her she suffered an agony of pain such as you cannot conceive, such as you never have felt and never can feel. And yet in a few minutes after this anguish she has greeted you with a sweet smile. Let us, then, in our time of suffering, be gentle and patient and kind to those who are doing their best for us. A very great deal may be done by earnest trying.

Medical Advice.—When a medical man is consulted, it is a tacit acknowledgment of confidence in him by the patient; that confidence should be implicit, or placed elsewhere. In the first place, care should be taken that the necessary directions given are fully and accurately understood; being so, they should be as fully and accurately followed out, unless some evident change in the condition of the patient, or in circumstances which the prescriber could not foresee, renders a departure from them necessary; but of this he should have as early notice as possible. There is no greater folly than to call in a medical man, and then, either from willfulness or weakness of purpose, to controvert or neglect his prescribed rules; it is only equalled by that which conceals or deceives in the particulars of a case, and looks for benefit. It is too commonly the case in illness, that officious persons are continually offering their counsel and opinions, disturbing the mind of the patient or of the friends, and perhaps undermining the trust reposed in the attendant practitioner; if it is reflected for one moment, how worthless such counsel and opinions must be, they would be less attended to than they are. Again, if proper confidence is felt in the judgment of the medical attendant, his requirements should be submitted to without remonstrance or grumbling. When doubt and uneasiness respecting the progress or prospects of a case are felt by those **most interested**, and a second opinion is desired, the matter should be openly, at once, stated to the ordinary attendant, and his views and wishes heard; but never should another be called in till this has been done; still less, even if a medical man can be found to demean himself so far, should a secret opinion be taken. Lastly, in sending for medical assistance, especially in country districts, as full an account of the symptoms of the illness, or accident, as possible should be transmitted by written note. The precaution must save time; it may save life.

PART NINE—*Therapeutics*

The Use and Action of Medicines and Other Curative Measures

LIGHT, HEAT, ELECTRICITY, ETC.

Subject Reference

For Simple Household Remedies, see pages 595-599.

Useful Prescriptions, pages 601-634.

For Meaning of Medical Terms (words or phrases), see Dictionary, pages 681-689.

Useful Prescriptions

How Medicines Are Administered, Combined and Used to Enhance or Counteract Each Other.

The Meaning of Abbreviations Used by Physicians in Writing Prescriptions

INSTRUCTION SIXTY-SEVEN—*Curative Measures*

Therapeutics (the word is derived from the Greek *therapeuo*, "I wait upon," "I attend upon the sick," "I alleviate"), means the explanation of the action of medicines. A medicine is any substance which may be used in relieving the sick; medicines are, therefore, **therapeutic agents**. But other agents, such as the forces of nature (light, heat, electricity, etc.), acts of the physician or nurse (surgical operations, massage, etc.), and efforts of the patient himself (dieting, exercise, etc.), are also used in curing the sick, and must, therefore, be classed as therapeutic agents, but they are not medicines.

Medicines are administered in a variety of ways for the purpose of combating disease. They should be so selected for a given case that their physiological action upon the system, or part of the body, shall counteract the abnormal condition present and bring about a return to the normal state. For instance, Pilocarpin has the effect of increasing the secretion of the sweat, and of stimulating the glands secreting watery fluids, such as the tear and salivary glands; it is, therefore, indicated in cases in which suppression of secretion exists, as, for instance, in the febrile stages of many diseases, the immediate effect being a profuse sweating and a consequent lowering of the temperature. But most medicines have more than one definite physiological action, and it becomes necessary to enhance the one or counteract the other, which may be done by combining medicines. For instance, if we give small doses of calomel for its action upon the liver and the alimentary canal, we can enhance its action by combining it with an alkali, such as bicarbonate of soda; or if we give aloes as a drastic purge, we can mitigate the griping produced by the drug by combining with it some aromatic, as cardamom or some essential oil, as oil of cloves.

Medicines are also combined in order to produce their effect upon different parts of the system at the same time. And, finally, medicines are combined in order to make them more agreeable to the senses of the patient, and in some degree rob them of their nauseous qualities.

Fewer drugs are used nowadays in a prescription than in the days of the "shot-gun" prescription—when a large number of drugs were mixed together and given in the hope that some of them would hit the mark and effect a cure. Now more accurate diagnosis and a more definite knowledge of the action of drugs makes guesswork unnecessary. The modes of administering drugs have also been greatly improved; this is possible, to a certain extent, to the use of the **active principle** (or useful constituent) of a drug instead of the entire drug; for example, the same action is obtained from the use of 1-1000 of a grain of Atropine, the active principle of Belladonna, as from three or four grains of the drug itself; so that the bulk is diminished. The hypodermatic administration of drugs is a valuable method for administering many drugs, their action being more prompt and sure when given in this way. The emetic, Apomorphine, administered hypodermically acts within half a minute, and never fails, if the dose is sufficient.

Medicines may be **administered** in a variety of ways, one or other of which should be selected according to circumstances. The usual method of giving medicines is **by the mouth**, to be swallowed and absorbed from the stomach into the system; also by **injection into the bowels**, or **under the skin** by the hypodermic method; or by **inhalation**, to be absorbed by the lungs, or as an **application** to the skin or mucous membranes of the body.

Physicians in larger cities and towns do not usually themselves dispense medicines to their patients direct, but write an order, termed a prescription, for the drugs they wish to give. This is taken to a druggist or apothecary, who mixes the drugs or medicines ordered by the physician for the patient. He usually keeps the prescription on file, and is thus the custodian of the same. In prescriptions certain abbreviations and signs are used which are remnants of the old style of writing prescriptions in Latin, which was done to prevent the patient from knowing what was prescribed for him. A list of the more common ones is here given:

Abbreviations Used in Prescriptions.

aa.=Ana=Of each.	Div.=Divide=Divide.
Ad.=Adde=Add.	Fl.=Fluidum=Fluid.
Ad. lib.=Ad libitum=At pleasure.	Ft.=Fiat=Make.
M.=Misce=Mix.	Guttatim=Drop by drop.
Mass.=Massa=Mass.	Q.S.=Quantum Sufficit=Sufficient quantity.
Mist.=Mistura=Mixture.	Q. V.=Quantum Vis.=As much as you choose.
Pil.=Pilula=Fill.	R.=Recipe=Take.
Aliquot=Several, some.	Sig.=Signa=Write.
Chart.=Chartula=Small paper.	ss.=Siemis=Half.
Collyr.=Collyrium=Eyewater.	
D.=Dosis=Dose.	

The **dose** of the medicine to be given is of the utmost importance. The age of the patient, **idiosyncrasies** or peculiarities toward certain drugs, if such exist in the individual, and **tolerance** of the system to the effects of medicines produced by continued use or by other conditions, must be considered in fixing the size of the dose. Carelessness in this portion of the art of prescription writing is very dangerous, for the difference between a **poison** and a **medicine**, in most

instances, lies only in the **amount** given. Further, many drugs have a **different physiological action** when given in different doses; for instance, ipecac acts as an **anti-emetic** and stomach stimulant in doses of $\frac{1}{6}$ to $\frac{1}{3}$ grain, but in doses of from $\frac{1}{2}$ to $1\frac{1}{2}$ grains it acts as an **expectorant** and diaphoretic, and finally, if the dose is increased to 2 to 4 grains, it acts as a prompt **emetic**.

For a child the dose is that part of the dose for an adult represented by the following fraction: $\frac{\text{Age}}{\text{Age}+12}$. Thus, if the dose for an adult is one teaspoonful (=60 drops), then for a child 8 years old the dose is $\frac{8}{8+12}$ of 60= $\frac{8}{20}$ of 60, or 24 drops. Narcotics, such as opium or any of its preparations, must be used very cautiously with children, always in much smaller doses than those indicated above.

In a prescription, the amount which is to be taken at a dose, and the number of times in the twenty-four hours, and the interval of time which is to elapse between the doses, should be written in plain English. Spoons, tumblers and cups are generally designated as fluid measures, although it would be safer and more correct to order the patient to procure a medicine glass, which is graduated into drams and ounces. The capacity of different spoons, tumblers and cups varies greatly.

Capacity of Household Measures.

Teaspoonful=One dram.	Dessertspoonful=Two drams.
Tablespoonful=Four drams.	Wineglassful=One and a half to two ounces.
Teacupful=Five ounces.	Breakfastcupful=Eight ounces.
Tumblerful=Ten to twelve ounces.	

It is safer to prescribe the small amounts of liquids in minims and not in drops, as is so frequently done, because the number of drops in the fluid dram varies so greatly with different liquids, as seen in the following:

Number of Drops to a Fluid Dram.

Acids.—Acetic, 108; Hydrocyanic Dil., 60; Muratic, 70; Nitric, 102; Nitric Dil., 60; Sulphuric, 126; Sulphuric Arom., 146; Sulphuric Dil., 56.

Aether.—Sulphuric, 137.

Alcohol, 146; Alcohol Dil., 120; Fowler's Solution, 57; **Oils**, Essential Oils of Vegetables, 120; Tinctures of Vegetables, 120; of Iron, 132.

Vinegars, 78; Waters, distilled, 45; Ammonia, strong, 54; Ammonia, weak, 45.

Wines, 78; Antimony, 72; Colchicum, 106; Opium, 100.

The number of drops also depends largely on **what kind of a receptacle** the liquid is pressed or dropped from.

The amount of each **solid** drug in a prescription is expressed in grains, scruples, drachms, ounces and pounds; if it is a **liquid**, in minims, drachms, ounces, pints and gallons. These weights and measures are designated by special signs.

The amount is expressed in **Roman numerals** (i, ii, iv, etc.) placed after the symbol. A table of the apothecaries' weights and measures is here given.

Table of Apothecaries' Weights.

20 Grains=one scruple.	or, written in symbols:—
3 Scruples (or 60 grains)=one drachm (or dram).	grs. xx=℥j
8 Drachms=one ounce.	℥ij (or grs. lx)=3j
12 Ounces=one pound.	3vij=3j
	3xij=℔j

Measure by Capacity.

Apothecaries' Liquid Measure.

	Units and Signs.
60 Minims (or drops)=one fluid drachm (fl. dr.).	Drop, <i>minim</i> , m
8 Drachms=one fluid ounce (fl. oz.).	Drachm, <i>drachma</i> , ʒ or dr.
16 Fluid ounces=one pint (wine measure).	Scruple, <i>scrupulus</i> , ℥ or sc.
20 Fluid ounces=one pint (Imperial measure).	Ounce, <i>uncia</i> , ʒ or oz.
8 pints=one gallon.	Pound, <i>libra</i> , ℔.
	Pint, <i>congius</i> , C or pt.
	Gallon, <i>octavius</i> , O or gallon.

I. METRIC WEIGHTS.

In France, Great Britain and Germany and to an increasing extent in this country, the metric system of weights and measures is used in prescription writing, and then the amount is placed in ordinary (Arabic) figures after the symbol.

- 1 Myriagram=10,000 grams.
- 1 Kilogram=1,000 grams.
- 1 Hectogram=100 grams.
- 1 Decagram=10 grams.
- 1 Gram=the weight of a cubic centimeter of water at 4° C.
- 1 Decigram=one-tenth part of a gram.
- 1 Centigram=one-hundredth part of a gram.
- 1 Milligram=one-thousandth part of a gram.

To convert a quantity expressed in grams into decagrams, move the decimal point one place to the left; into hectograms, move it two places to the left; into kilograms, move it three places to the left; into myriagrams, move it four places to the left.

To change grams into decigrams, move the decimal point one place to the right; into centigrams, move it two places to the right; into milligrams, move it three places to the right.

II.—ENGLISH MEASURES.

Relation of the Metrical Measures to the Measures of the U. S. Pharmacopœa.

1 Myrialiter=2,641.9 gallons.	1 Liter=2.113 pints.
1 Kiloliter=264.19 gallons.	1 Deciliter=3.381 fluid ounces.
1 Hectoliter=26.42 gallons.	1 Centiliter=2.705 fluid drams.
1 Decaliter=2.64 gallons.	1 Milliliter (1 cubic centimeter)=16.231 minims.

Nautical Measure.**Knots.**

1=6,075.6 Feet (or 6.080 Feet, Admiralty).

3=1 League.

60=1 Degree=69.04 English Miles.

A Cable's length=607.56 feet=1/10 of a Sea Mile.

Long Measure.**Inches.**

12= 1 Foot.

36= 3 = 1 Yard.

72= 6 = 2 = 1 Fathom.

198= 16.5= 5.5= 2.75= 1 Perch.

7,920= 660 = 220 =110 = 40=1 Furlong.

63,360=5,280 =1,760 =880 =320=8=1 Mile.

Square Measure.**Inches.**

144= 1 Foot.

1,296= 9 = 1 Yard.

39,204= 272.25= 30.25= 1 Perch.

1,568,160=10,890 =1,210 = 40=1 Rood.

6,272,640=43,560 =4,840 =160=4=1 Acre.

640 Acres=1 Square Mile.

Land Measure.**Inches.**

7.92= 1 Link.

792 = 100=1 Chain.

63,360 =8,000=80=1 Mile.

Land Measure (Square).**Links.**

625= 1 Perch.

10,000= 1 Chain.

25,000= 2.5=1 Rood.

100,000=10 Chains =4 Roods =1 Acre.

Capacity.

1 Pint=34.66 Cubic Inches.

1 Quart=69.318 Cubic Inches.

1 Gallon=277.274 Cubic Inches.

1 Gallon=10 lbs. water at 62° Fahr.

1 Cubic Foot= 6.232 Gallons.

224 Gallons=1 Ton (long ton).

Weight.

1 oz.=437.5 grains.

1 lb.=16 oz.=7,000 grains.

1 gallon of water=70,000 grains=10 pounds.

“A pint of water weighs a pound and quarter,” and a gallon therefore weighs 10 pounds.

1 cubic foot of water=6.232 gals.

1 inch of rain=4.67 gals. per square yard, or 101 tons (=22,624 gals.) per acre.

III.—COMPARATIVE TABLE.**Wine Measure.****Imperial Measure.**

1 minim .....	.96 minim
1 fl. oz. or 480 minims.....	.96 fl. oz. or 460.8 minims
10 fl. oz.	9¾ fl. oz.
pint=16 oz.	1 pint=20 oz.
5 gal.	4 gal.

IV.—TABLE FOR CONVERSION OF WEIGHTS AND MEASURES.

As 1 gallon of water weighs 70,000 grains, therefore—

To convert parts per 1,000,000 (=milligram per liter) into grains per gallon, multiply by 0.07.

To convert parts per 100,000 into grains per gallon, multiply by 0.7 (or 7/100).

To convert grains per gallon into parts per 1,000,000, multiply by 14.3 (i. e., 14 3/10).

V.—COMPARISON OF METRICAL WITH ENGLISH MEASURES.

a. Weight.		b. Capacity.	
	Grains.		Cubic Inches.
1 Milligram	= 0.015	1 Cubic Centimeter	= 0.061
1 Centigram	= 0.154	1 Liter	= 61.027
1 Decigram	= 1.543		
1 Gram	= 15.432	1 Cub. Inch	= 16.386 Cub. Cent.
1 Kilogram	{ = 15432.349	1 Fluid Oz.	= 28.35 " "
	{ = 2.2 lbs. (Avoir.)	1 Gallon	= 4.543 Litres = 160 oz.
	{ = 35.3 oz.	1 Cubic Foot	= 28.2 " "
c. Length.		d. Area.	
1 Meter	= 39.37 Inches.	1 Square Meter	= 10.76 sq. ft.
1 Decimeter	= 3.94 "	1 " Centimeter	= 0.154 sq. in.
1 Centimeter	= 0.39 "	1 " Millimeter	= 0.0015 "
1 Millimeter	= 0.039 "	1 " Kilometer	= 247 acres.
1 Kilometer	= 1094 Yards.	1 Hectare	= 2.47 "
e. Weights Compared.		f. Length.	
1 grain	= 0.0648 grams	1 inch	= 2.54 centimeters
1 ounce	= 28.3495 grams		(or 25.4 millimeters)
1 pound	= 453.592 grams	1 foot	= 30.48 centimeters
1 stone	= 6.35 kilograms	1 yard	= 91.44 centimeters
1 cwt.	= 50.8 kilograms		(or .9144 meter)
1 ton	= 1016 kilograms	1 mile	= 1609.315 meters

To convert inches into centimeters, multiply by $\frac{254}{100}$

To convert centimeters into inches, multiply by $\frac{100}{254}$

VI.—FLUID MEASURES COMPARED.

Imperial Measure.	Metric Equivalent.
1 minim	0.06 cubic centimeter
1 fluid drachm	3½ c. c.
4 " drachms	14 c. c.
1 " ounce	28½ c. c.
4 " ounces	113½ c. c.
8 " "	227 c. c.
16 " "	454½ c. c.
1 pint (20 oz.)	568 c. c.
½ gallon	2¼ liters
1 " "	4½ "
5 " "	22½ "

A USEFUL TABLE FOR SOLUTIONS.

Showing the amount of any solid required to make with one Imperial Pint of water the following approximately correct solutions.

To make a

10%	or 1 in	10 solution use	875	grains of the drug in 1 pint of water.
5%	or 1 in	20 solution use	437½	grains of the drug in 1 pint of water.
2%	or 1 in	50 solution use	175	grains of the drug in 1 pint of water.
1%	or 1 in	100 solution use	87½	grains of the drug in 1 pint of water.
½%	or 1 in	200 solution use	43¾	grains of the drug in 1 pint of water.
1-10%	or 1 in	1,000 solution use	8¾	grains of the drug in 1 pint of water.
1-50%	or 1 in	5,000 solution use	1¾	grains of the drug in 1 pint of water.

Solubilities.

Amounts of some salts soluble in water at 15° to 18° C.

Sodium Chloride (table salt)	36 parts dissolve in 100 of water
Sodium Sulphate	50 parts dissolve in 100 of water
Ammonium Chloride	36 parts dissolve in 100 of water
Ammonium Sulphate	50 parts dissolve in 100 of water
Magnesium Sulphate (Epsom salts)	125 parts dissolve in 100 of water
Zinc Sulphate (white vitriol)	160 parts dissolve in 100 of water

VII.—TEMPERATURE.

In the Fahrenheit scale water freezes at 32° and boils at 212°; there are 180° F. between freezing and boiling. In Centigrade water freezes at 0° and boils at 100°. In Réaumur, water freezes at 0° and boils at 80°. Therefore 180° F.=100° C.=80° R.

Centigrade (100°)	Réaumur (80°)	Fahrenheit (212°)—32
5	4	9

To convert degrees Centigrade or Réaumur into degrees Fahrenheit, or vice versa, the following are the formulæ to be used:—

9C	9R	Thus—
$F = \frac{9C}{5} + 32$	$F = \frac{9R}{4} + 32$	Cent. Fah. Réaum.
5	4	85° = 185° = 68°
$5(F-32)$	$4(F-32)$	35° = 95° = 28°
$C = \frac{5(F-32)}{9}$	$R = \frac{4(F-32)}{9}$	16° = 60.9° = 12.8°
		etc. etc. etc.
5R=4C.		

	Centigrade.	Réaumur.	Fahrenheit.
Water freezes at.....	0:0	0:0	32:0
Water has its maximum density ¹ at.....	4:0	3:2	39:2
Water boils at.....	100:0	80:0	212:0
Standard barometric pressure=760 millimeters=29.922 cubic inches.			
30 inches	=762	"	
29.5 "	=742	"	
29 "	=732	"	

¹ Maximum density is the condition in which the substance has its greatest weight for any given volume. Thus water is heavier (a cubic inch, or a pint, weighs more) at 39.2° Fahrenheit than when it is either warmer or cooler. Hence the water nearer freezing, being lighter, comes to the surface or ice forms there instead of at the bottom.

***Simple Remedies
May Save A Long Illness if Applied
at the Right Moment***

ARTICLES AND REMEDIES THAT EVERY HOUSEHOLD
SHOULD BE PROVIDED WITH AT ALL TIMES.

Subject Reference

*For Useful Prescriptions, see
pages 601 to 634.*

*How to Give
Massage and
Baths, pages 639
to 645.*

In cases of accident or sudden sickness, **time** is often of the utmost importance. A very simple remedy applied at the right moment may often save a long illness. It is therefore desirable to have ready whatever is likely to be wanted suddenly. Get a small box. Use it for medicines and for nothing else. Keep it always locked and out of the way of the children, where you can lay your hand upon it in a moment. Do not have too many things in it, as they will confuse you, but put into it what you are most likely to want.

A roll each of old **linen**, of **calico**, and of **flannel**, the older the better, but **clean** and dry. A little **lint** and some **sticking-plaster**. The calico and flannel may be in strips, so as to serve for bandages, which should be of different widths, the most useful being $\frac{1}{2}$ in. for the finger, $1\frac{1}{2}$ for the arm, 2 in. for the leg and $2\frac{1}{2}$ for the body. Fasten each roll with a pin.

A pair of **scissors**, some **pins**, **tape**, and a few large **needles** ready threaded.

Some **castor oil**, **syrup of ipecac**, **paregoric**, **turpentine**, **senna leaves**, **Epsom salts**, **bicarbonate of soda** (baking soda), a small bottle of **laudanum** (marked "poison") and a pint bottle of equal parts of **linseed-oil** and **lime-water** (carron oil).

We want also a **measuring-glass**. Nearly all liquid medicine is given by "spoonfuls." A "spoon" is a very uncertain measure; spoons differ very much in size; therefore it is better to buy a glass marked correctly, **teaspoons** on one side and **tablespoons** on the other.

A **feeding-cup** is very useful. In case of broken thigh, and some other illnesses, the patient cannot be raised, and it is impossible to give him liquids with any degree of comfort while he is lying down. A not uncommon occurrence is the following: A lady, who was in a very weak state, was raised (in opposition to the orders of the doctor), as the nurse said, "just for a minute, to give her a drink;" but that minute and the mischief, for her heart, not having power to continue its work in that position, stopped, and she fell back dead.

If one of these cups is not at hand, a small tea-pot, or anything with a narrow spout, will answer. If the sufferer, parched with fever, is crying out, as they frequently do, "Oh, please give me a big drink," get a clean straw, bend one end of it gently into the glass, and the other into the mouth. This is always got easily in the country,—but the best thing for the purpose is a foot of small india-rubber tubing, such as is used for infants' feeding-bottles. It costs about eight cents, can be bent in any direction, is not easily broken, and will last for a long time. It may be cleaned by boiling in water with a little baking soda (quarter of a teaspoonful). Or a glass tube bent L-shaped or V-shaped is yet handier and will never wear out.

In some cases it is desirable to give only a small quantity of fluid at a time; and it is a tantalizing thing to offer a drink, and insist upon the patient taking only a portion of it, or to make the total quantity seem smaller by putting it into a large glass. This may be avoided by having a cup or glass that **holds just what may be taken**. A child who could not by any amount of argument be induced to leave part of what is in the glass, nor be put off with a few spoonfuls in a large one, will be quite contented if you let it have its own particular glass quite full, with liberty to drink it all, though it does not contain as much as what would not satisfy if given in a larger vessel.

The cost of the whole of the above stock is only a trifle. Prices vary according to where you make your purchases; but do not mistake low price for cheapness. These are very different things, especially in important things like medicines. If you insist upon paying a very low price for an article, you get either what is kept till it has deteriorated, or what is adulterated. A doctor was writing a prescription in a drug store when a child came in with a small packet in her hand, and said, "Please, mister, mother sent this magnesia back and says you've cheated her shameful, she can get twice as much for a penny at the other druggist's." The druggist gave her double the quantity, and said, "Be sure to tell your mother that the other was stronger, and so I could not give her as much of it." When she was gone, he said to the doctor, "Now here is a difficult case. You doctors find fault with us for not selling pure drugs. I gave her pure magnesia the first time for her penny, but she must have more bulk, so I have to mix a quantity of chalk with it; and now she goes away boasting that she has given the druggist a lesson not to try to cheat people." The consequence is that if the patient takes only the dose the doctor ordered, the medicine has not its proper effect, and in case of serious illness the result may be a life lost in consequence.

Be very careful about the **size** of the dose, especially if given without a doctor's orders. Medicine given at random and in guessed doses is as likely to kill as to cure.

Medicines may be divided in general into two classes: 1. One in which the medicine seems to accumulate in the system, and where the quantity taken must therefore be gradually **decreased**. 2. One in which the body appears to get used to the medicine, which loses its effect, and so the dose has to be gradually **increased**. Of this latter class is opium. If it be taken regularly for a length of time, the quantity which at first would remove the pain has to be increased so much that if it were taken at the commencement before the "tolerance" is established it would certainly cause death; or if the patient who has taken it for a length of time gives it up for a time and then returns to his full former dose, it will prove dangerous. A gentleman who had a very painful nervous disease had prescribed for him a medicine containing opium. After taking it for some weeks in gradually increased quantities, the trouble left him, and he discontinued the medicine. A few weeks after this the pain returned suddenly in the night; his wife measured out and gave him the same dose at which he had left off. He soon fell into a deep sleep, from which he never awakened. The lesson of this is: When a medicine containing any preparation of opium, or any other soothing drug to relieve pain and procure sleep, is given for a season, left off and then returned to, do not begin again with the dose at which it was left off, but with the dose given at the commencement of the illness.

Administering Medicines.—Whenever doses of medicine are given, they are, unless it is otherwise specified, such as are suitable for an adult; the following table is generally considered a sufficient guide for the doses for the different ages:

Suppose the dose to be 60 grains or 1 drachm for an adult..... $\bar{3}$ i

Under—

1 year	the dose will be.....	$1/12 = 5$ grains.....	gr. v
2	".....	$1/8 = 8$ grains.....	gr. viii
3	".....	$1/6 = 10$ grains.....	gr. x
4	".....	$1/4 = 15$ grains.....	gr. xv
7	".....	$1/3 = 1$ scruple.....	S i
14	".....	$1/2 = 1/2$ drachm.....	$\bar{3}$ fs
20	".....	$2/3 = 2$ scruples.....	S ii
21 to 60 years	.....	1 drachm.....	$\bar{3}$ i

Above sixty—that is, in old age, the dose gradually diminishes.

Although the above table is, and may be, accepted as an average rule, it must not, by any means, be adopted as an invariable one in practice, without reference to the constitution, state of health, etc., of the individual. A strong child at three years of age may require, and may tolerate better, a much stronger dose than a weaker or weakly one two years older. Moreover, in the case of many aged persons, purgative medicines especially, will often require to be used as actively as in the young. Again, in such a medicine as opium, the proportions given in the table are rather too large for children, whilst, on the other hand, in the administration of mercurials, such as calomel or grey powder, they would reduce them too greatly.

As a general rule, women require smaller doses of medicine than men, and at the same time, it is always requisite to keep in view the peculiarities, periodical and otherwise, of their constitutions; and in the case of matrons, the possibility of pregnancy. It is better to avoid the use of strong purgatives, and of astringents, during the healthy menstrual period. In some cases, all relaxing remedies, such as warm bathing of the feet, and diaphoretic medicines, are inadmissible during the same event. Temperament, in all cases, requires to be considered in the administration of medicine.

There is some art—and a good deal depends upon it—in administering medicines properly, not only to children, but to adults. It is a very common popular saying, that “doctors do not give sugar-plums,” and verily, unless it be the homeopaths, they do not. At the same time, much may be done to lessen the nauseousness of many drugs. The aromatic waters, such as peppermint, cinnamon, etc., are as much disliked by some, as they are liked by others; their addition to medicines may, therefore, generally—unless they are given as carminatives—be left to choice; as a rule, they do not render the medicine more palatable. The introduction, however, of glycerine and chloric ether into prescribing, has greatly increased the power of making medicines palatable; alkaline medicines which could not be modified by sugar, are now much improved by a little glycerine for children, or chloric ether for adults, especially when combined with an aromatic such as peppermint water or orange tincture. The same applies to sugar and syrups; in cough medicines and the like, sweetness may be agreeable, and an advantage, but in the case of a nauseous medicine, sweetening it only renders it more sickly to most patients. The fewer additions made to the essential medicine—what physicians call the “basis”—the better. In the case of children, bulk is always an objection to be guarded against, as far as possible. The fact is, per-

haps, not sufficiently realized practically, that one most efficient method of avoiding the taste of nauseous medicine is to blunt for a time the acuteness of the nerves of taste; nothing does this so well and agreeably as the essential oil of orange or lemon peel. A small piece of the rind of either of the above fruits chewed, just before and immediately after swallowing the dose, is very efficacious; or cold water held in the mouth just before will lessen the taste.

The nature of the medicine and its form should, in some degree, bear a connection with the periods of the twenty-four hours. **Tonic** remedies generally are better taken **before meals**; the time for taking **purgatives** should, in some measure, depend upon their nature. Unless for some special purpose, liquid purgatives, such as castor oil, senna, salts, etc., which, like liquid **medicines** generally, exhibit their action quickly, should not be taken late in the evening, when their action will probably disturb the night's rest; pills and powders on the other hand, which are slower in their action, may be, and generally are, taken at night. Although medical men order some medicines to be taken upon a full stomach for special purposes, the generality are better taken when the stomach is empty, or nearly so; tonics, purgatives, astringents, etc., particularly. In the first place, they are not so likely to interfere with the process of digestion, and in the second, their proper action is more readily and effectually obtained.

In conclusion, it might be thought by some that more, what medical men call prescriptions, and the public recipes, might have been given throughout this work generally; but the principle of **safe domestic medicine** has been followed here—it is not attempted to furnish a set of nostrums, one “good for” this complaint, and another “good for” some other, to be used without reason why or wherefore. Such a concession to a blind **popular craving** is truly mischievous, and antagonistic to the intelligent management of disease, more or less, according to circumstances, and which is based upon a true, even though a superficial, knowledge of the functions and requirements of the human body and constitution.

STRICTLY

ETHICAL

NOTE: THE CONTENTS OF THIS WORK AND "THE INSTRUCTIONS" GIVEN ARE STRICTLY ETHICAL AND SUCH AS EVERY GOOD PHYSICIAN AND SURGEON DESIRES TO SEE IN THE POSSESSION OF HIS PATIENTS SO THAT THEY MAY INTELLIGENTLY FOLLOW HIS PRESCRIBED RULES.

THESE INSTRUCTIONS SHOULD FORM A PART OF THE EDUCATION OF ALL.

IGNORANCE OF THE STRUCTURE AND FUNCTIONS OF THEIR OWN BODIES, OF THE REQUIREMENTS OF THEIR OWN CONSTITUTIONS AND OF THE TRUE PRINCIPLES ON WHICH SOUND HEALTH IS TO BE PRESERVED, MUST BE OVERCOME BY PLACING THE NECESSARY KNOWLEDGE BEFORE THE PEOPLE IN THE FORM OF SPECIAL INSTRUCTIONS.

THE EXTENSIVE DIFFUSION OF SUCH KNOWLEDGE CAN AND WILL PUT AN END TO PREVAILING IGNORANCE.

INSTRUCTION SIXTY-NINE—*Prescriptions*

Register of
Useful Prescriptions

With Instructions as to the Use and Abuse of Medicines

(Also see Index for other remedies.)

Abbreviations: Comp.=compound; Dr.=drachm; Ext.=extract;
Fl.=fluid; Gr.=grain; Inf.=infusion; Powd.=powder or powdered;
Sps.=spirits; Syr.=syrup; Tr.=tincture.

Acidity of stomach (sour stomach; pyrosis)—

- (1) Subnitrate Bismuthdrs. 3
Carbolic Acidgrs. 3
Gum Arabic Mucilage.....oz. 1
Peppermint Aquæoz. 3

Dose: Tablespoonful three or four times daily, for an adult.

- (2) Bicarbonate Sodadrs. 2
Sps. Am. Arom.....drs. 2
Tr. Gingeroz. 1
Comp. Inf. Gentian, to make.....oz. 8

Dose: Tablespoonful or two, three times daily.

- (3) Aromatic Sps. of Ammonia.....drs. 1½
Comp. Sps. Ether.....dr. 1
Syr. of Ginger.....drs. 2½
Anise Wateroz. 3½

Dose: One-third of this mixture, to be frequently repeated if necessary.

Acne or pimples—

- Acetate Potashgrs. 40
Nux Vomica Tr.....drs. 2
Yellow Dock, fl. ext.....oz. 4

Dose: Teaspoonful in wineglass of water half hour before meals.

In addition apply following lotion to pimples:

- Sulphurdr. 1
Glycerineoz. 1
Rose Wateroz. 7

Ague—Anti-periodic.

Cinchonidin	grs. 2
Comp. Ext. of Colocynth.....	gr. 1/3
Oil of Black Pepper.....	gr. 1/6
Sulphate of Iron.....	gr. 1/2

Dose: Two to four.

Alcoholism—To overcome desire use:

(1) Tr. Capsicum	oz. 1/2
Bromide Potash.....	oz. 1/2
Aromatic Sps. Ammonia.....	drs. 3
Syr. Tolu, to make.....	oz. 6

Dose: Dessertspoonful in water four or five times daily.

Alcoholism—To overcome sleeplessness in:

Tr. Nux vomica.....	dr. 1
Comp. Tr. Gentian.....	drs. 3
Sps. Lemon	drops 6
Sps. Chloroform	dr. 1
Water to make.....	oz. 6

Give a tablespoonful three times daily.

(3) When the stomach is disordered, give:

Comp. Tr. Gentian.....	oz. 2
Comp. Tr. Calumba.....	oz. 2
Tr. Nux vomica.....	drops 80

Dose: A dessertspoonful before each meal (three times a day).

Alcoholism (chronic)—

(1) Tr. Oxide	dr. 1
Pepper	grs. 20

Mix and make into 20 pills.

Dose: One pill three or four times a day.

(2) Tr. Capsicum	oz. 1
Tr. Ginger	oz. 1
Ammoniated Tr. Valerian.....	oz. 2

(3) Comp. Tr. Gentian.....	oz. 2
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Dose: A dessertspoonful in a teacupful of hop tea three or four times a day.

Amenorrhœa—

Myrrhgrs. 8
 Powd. Jalapgrs. 15
 Dried Iron Sulphate.....grs. 60
 Powd. Aloes and Canella.....grs. 60
 Syrup, enough to make into pill.

Divide into 50 pills.

Dose: Two or three pills at bedtime for several nights.

Anodyne—

Camphorgr. 1
 Acetate of Morphine.....gr. 1/20
 Ext. of Hyoscyamus.....gr. 1
 Oleo-Resin of Capsicum.....gr. 1/20

Dose: Two to five for severe pain.

Anemia—

Chloride of Potash.....gr. 1
 Chloride of Iron.....gr. 1/2
 Podophyllum Powd.....gr. 1
 Powd. Myrrhgr. 1/2

This makes one pill. Dose: One after each meal.

Or,

Tr. Iron Chloridedrs. 4
 Dilute Phosphoric Aciddrs. 6
 Sps. Lemondrs. 2
 Simple Syrup to make.....oz. 6

Dose: A dessertspoonful in a wineglass of water after food three times a day.

Or,

Quinine Sulphategrs. 20
 Dried Iron Sulphate.....grs. 40
 Strychninegr. 1/2

Divide into twenty pills and give one after meals, three times a day.

Or use Basham's Mixture, which see.

Anti-constipation (A. B. S.=aloin, belladonna, strychnia)—

Aloingr. 1/5
 Ext. of Belladonna.....gr. 1/8
 Strychniagr. 1/60

Dose: One after each meal. Omit one or two if the bowels move oftener than once in the twenty-four hours.

Aperient Pill (Abernethy's)—

Powd. Socotrine Aloes.....	grs. 2
Powd. Ipecac	gr. 5/6
Mercury Pill	gr. 1
Ext. of Hyoscyamus.....	grs. 2

Appetite—To improve:

Gentian.	drs. 2
Quassia.	drs. 2
Cinnamon.	drs. 2

Put into a pint of boiling water, and when cold strain. Take a wineglass thrice daily.

Aromatic Powder—

Powd. Cinnamon	oz. 7
Powd. Ginger	oz. 7
Powd. Cardamon	oz. 3
Powd. Nutmeg	oz. 3

Aromatic Spirits of Ammonia (stimulant)—

Ammonia Carbonate	grs. 500
Ammonia Water	fl. drs. 22
Oil of Lemon.....	fl. drs. 2½
Oil of Lavender Flower.....	drops 12
Oil of Pimenta.....	drops 10
Alcohol	fl. oz. 22
Distilled Water	pints 2

Dose: One-half to one teaspoonful as a stimulant in faintness.

Asthma—

- (1) Nitrate of Potash Paper, made by soaking sheets of paper in a saturated solution of nitrate of potash.

Use: Burn one in a closed room and inhale the fumes.

- (2) Bromide of Ammonium.....grs. 160
 Chloride of Ammonium.....grs. 90
 Tr. Lobelia drms. 3 || Comp. Sps. Ether..... | oz. 1 |
| Syrup Acacia, to make..... | oz. 4 |

Use: Dessertspoonful in water every hour or two till relieved.

- (3) Tr. Lobelia oz. 1 || Iodide of Ammonia..... | drs. 2 |
| Bromide of Ammonia..... | drs. 3 |
| Syr. Tolu | oz. 2 |

Use: Teaspoonful every one, two, three or four hours, as required, to relieve.

- (4) Sps. Ether, Comp.....oz. 1
 Sulphate of Morphia.....gr. 1
 Water.....oz. 1

Use: Teaspoonful every half hour or hour during the paroxysm.

- (5) Iodide of Potash.....drs. 3
 Fl. Ex. Belladonna.....dr. 1
 Fl. Ex. Lóbelia.....drs. 2
 Fl. Ex. Grindelia.....drs. 4
 Glycerine.....drs. 12
 Water.....drs. 12

Dose: A tablespoonful every two or four hours as necessary.

- (6) Chloral Hydrate.....grs. 60
 Syr. Tolu Balsam.....oz. $\frac{1}{2}$
 Fennel Water.....oz. $1\frac{1}{2}$

Dose: A teaspoonful every half hour or hour until relieved.

Basham's Mixture (an iron tonic)—

- Tr. Chloride of Iron.....drs. $1\frac{1}{2}$
 Dilute Acetic Acid.....drs. 2
 Solution of Ammonium Acetate.....drs. 14
 Elixir of Orange.....drs. 14
 Syrup.....dr. 1
 Water.....drs. 42

Dose: One to two teaspoonfuls in water after meals.

Boric Acid Lotion—A saturated solution of boric acid in water.

Brandy—For stimulant, Aromat. Sps. Ammonia may be used instead.

Bronchitis (see also **Laryngitis**, p. 613)—

- Powd. Opium.....grs. 3
 Powd. Ipecac.....grs. 3
 Calomel.....grs. 3
 Potassium Nitrate.....grs. 30

Mix and divide into six powders.

Dose: One powder in syrup every three hours.

Or, At onset give Calomel (see p. 606) and this:

- Citrate of Potash.....drs. 2
 Solution of Ammonium Acetate.....oz. 4
 Wine of Ipecac.....drs. $1\frac{1}{2}$
 Chloroform Water to make.....oz. 8

Dose: Tablespoonful every two hours. For severe cough add doses of Chlorodyne.

Cathartic (and anodyne)—

Calomelgrs. 2

Opiumgr. 1

Dose: One.

Chilblains—

(1) Tr. Benzinedrs. 2

Linseed Oildrs. 4

Yellow Waxdrs. 2

GlycerineTo make an ointment

Use: Apply to the parts.

(2) Carbolic Acidoz. 1

Tr. Iodineoz. 2

Tannic Acidoz. 2

Make into an ointment. Use: Apply to the parts.

Chlorodyne—

Morphine Sulphategrs. 80

Dilute Hydrocyanic Acid.....oz. $\frac{1}{2}$ Glycerineoz. $\frac{1}{2}$ Carameloz. $\frac{1}{2}$

Ext. Cannabis Indica.....grs. 40

Oil of Peppermint.....drops 30

Oleo-Resin of Capsicum.....drops 15

Chloroformoz. 6

Rectified Spiritsoz. 1

Mix.

Dose: Two to fifteen drops. (See page 620.)

Cholera—Comp. Sps. Lavandula.....oz. $\frac{1}{2}$ Comp Sps. Ether.....oz. $\frac{1}{2}$ Sps. Camphoroz. $\frac{1}{4}$ Tr. Opiumoz. $\frac{1}{4}$

Dose: Twenty drops at short intervals.

Or,

Strychnine Sulphategr. $\frac{1}{4}$ Dilute Sulphuric Acid.....oz. $\frac{1}{2}$

Morphine Sulphategrs. 2

Camphor Wateroz. $3\frac{1}{2}$

Mix and give a teaspoonful, well diluted, every hour or two.

Or,

Phosphorusgr. $\frac{1}{50}$
 Zinc Sulphategr. 1
 Lupulingr. 1

Mix and make into a pill.

Dose: One pill once, twice or three times a day.

Cholera Infantum—

(1) Carbolic Acidgrs. 4
 Subnit. Bismuthdrs. 2
 Mucilage of Gum Arabic.....oz. 1
 Peppermint Wateroz. 3

Use: Teaspoonful every two, three or four hours.

(2) Sulphate Coppergr. 1
 Deodorated Tr. Opiumdrops 8
 Distilled Wateroz. 4

Use: Teaspoonful every two, three or four hours for a child one or two years old.

(3) Carbolic Aciddrops 24
 Brandydrops 24
 Peppermint Wateroz. $1\frac{1}{2}$
 Mucilage of Gum Arabic.....drs. 6
 Syrupdrs. 6
 Deodorated Tr. Opiumdrops 10

Use: Teaspoonful every two hours.

Mercury and Chalk.....grs. 3
 Bismuth Subnitrategrs. 24
 Powd. Nutmeggrs. 2

Mix and divide into twelve powders.

Dose: One powder every two hours.

Or,

Lead Acetategrs. 8
 Dilute Acetic Acid.....drops 6
 Tr. Opium Deodorated.....drops 4
 Simple Syrupoz. $\frac{1}{2}$
 Peppermint Wateroz. $\frac{1}{2}$

Mix.

Dose: A teaspoonful every two or three hours for a child two years old.

Colic—

Asafetidagrs. 2

Dried Iron Sulphate.....gr. 1

Dose: One to five in pill form, as required.

Or,

Comp. Sps. Ether.....dr. 1

Comp. Tr. Cardamon.....drs. 2

Camphor Waterdr. 1

Mix. This is one dose, to be repeated if necessary.

Compound Cholagogue Cathartic—

Podophyllin Resingr. $1\frac{1}{2}$

Mercury Pillgr. $\frac{1}{4}$

Ext. of Hyoscyamusgr. $\frac{1}{8}$

Ext. of Nux Vomica.....gr. $\frac{1}{16}$

Oleo-Resin of Capsicum.....drop $\frac{1}{8}$

Dose: Two to four.

Delirium Tremens—

Chloral Hydrategrs. 30

Distilled Waterdrs. 2

This is one dose. To produce sleep.

For boisterous delirium in a robust patient use:

Tartrate of Antimony and Potash.....gr. 1

Tr. Aconite Root.....drops 30

Tr. Opiumdrs. 2

Water to make.....oz. 4

Mix and give a dessertspoonful in porter (or in ale or water) every two or three hours.

Digestive Pill—

Pepsingr. 1

Nux Vomica in Powder.....gr. $\frac{1}{4}$

Gingergr. $\frac{1}{10}$

Sulphurgr. $\frac{1}{8}$

Mix and make into a pill.

Dose: One pill once, twice or three times a day.

Diphtheria—

Chlorate of Potash.....grs. 60

Hydrochloric Aciddrs. $1\frac{1}{2}$

Mix and add:

Tr. Iron Chloride.....drs. 2

Water to make up to 4 oz.

Use a teaspoonful as a gargle every two hours.

Lactic Aciddrs. $3\frac{1}{2}$
 Wateroz. 10

Mix and apply with a sprayer or a mop to the membrane to dissolve it.

Dizziness. See **Vertigo**.

Dover's Powder—

Powd. Ipecacgr. 1
 Powd. Opiumgr. 1
 Sugar of Milk (or Potassium Sulphate).....grs. 8

Dose: Five to fifteen grains for an adult.

Dysmenorrhea—

Fl. Ext. of Gelsemium.....drs. $2\frac{1}{2}$
 Elixir Simplexdrs. $5\frac{1}{2}$
 Syr. of Orange Peel.....oz. 1

Mix.

Dose: A teaspoonful every two hours.

Or,

Ext. of Cannabis Indica.....grs. 3
 Milk Sugargrs. 30

Mix and divide into six powders.

Dose: One powder every two or three hours.

Dyspepsia—

Powd. Ipecacgr. $\frac{2}{3}$
 Strychniagr. $\frac{1}{20}$
 Powd. Bl. Pepper.....grs. $1\frac{1}{2}$
 Ext. of Gentian.....gr. 1

Make into a pill.

Dose: One for dyspepsia.

Dyspepsia—

Rhubarb Root Powd.....dr. 1
 Powd. Aloesgrs. 40
 Soda Bicarbonatedrs. 2
 Bruised Valeriandr. $\frac{1}{2}$
 Bruised Serpentariadr. $\frac{1}{2}$
 Bruised Gentiandr. $\frac{1}{2}$
 Bruised Quassiadr. $\frac{1}{2}$
 Brandypints 2

Allow to stand in a lightly covered vessel twenty-four hours; then strain.

Dose: Half a wineglassful three times a day before meals.

Emmenagogue—

Dried Iron Sulphate.....	grs. $1\frac{1}{2}$
Powd. Aloes	gr. $\frac{1}{2}$
White Turpentine	grs. $1\frac{1}{2}$

Make into a pill.

Dose: One to three.

Epilepsy—

Bromide of Ammonia.....	drs. $2\frac{2}{3}$
Iodide of Potash.....	drs. $2\frac{2}{3}$
Bromide of Potash.....	drs. 6
Soda Bicarbonate	drs. 2
Tr. Calumba	oz. 2
Distilled Water	oz. 6

Dose: A dessertspoonful (for an adult) after each meal, and a tablespoonful at bedtime in half a glassful of water.

Erysipelas—

Permanganate of Potash.....	grs. 6
Distilled Water	oz. 6

Mix and keep in a glass-stoppered bottle.

Dose: A tablespoonful three times daily.

Expectorant and diuretic mixture—

Powd. Squill	gr. $\frac{1}{2}$
Powd. Jamaica Ginger.....	gr. 1
Gum Ammoniac	gr. 1
Soap	grs. $1\frac{1}{2}$

Dose: One to three.

Fetor of Armpits or Feet—

Baking Soda	oz. $\frac{1}{2}$
Water	pint 1

Use as a local wash.

Fevers ("Fever Mixture")—

Citrate of Potash.....	dr. 1
Aromatic Sps. Ammonia.....	drs. 2
Solution of Ammonium Acetate.....	oz. $1\frac{1}{2}$
Fl. Ext. Licorice.....	drs. 3
Glycerine	drs. 6

Water to make 6 oz.

Dose: Two teaspoonfuls every three or four hours.

Fever, Typhoid—

Oil of Turpentine.....drops 30
 Acacia Powd.....drs. 2
 Simple Syrupoz. 1
 Wateroz. 1

Shake well to form an emulsion. Shake before using.

Dose: A teaspoonful every two hours for diarrhea or tympanites (much gas in the bowels).

Flatulence—

(1) Tr. Asafetidagr. $\frac{1}{2}$
 Wateroz. 2

Mix.

Dose: A teaspoonful every hour or two, for children.

(2) Sulphurous Aciddrs. $1\frac{1}{2}$
 Syr. of Ginger.....drs. $6\frac{1}{2}$
 Wateroz. 1

Mix.

Dose: A teaspoonful.

Headache—

Etherdr. 1
 Aromatic Sps. Ammonia.....dr. 1
 Camphor Waterdrs. 10
 Comp. Tr. Cardamom.....dr. 1

Mix.

Take two or three times in the day, for nervous headache.

Hiccough—

Calomelgr. 1
 Milk Sugardr. $\frac{1}{2}$

Mix and make into twelve powders.

Dose: One powder every half hour.

Hives. (See Urticaria.)**Hoffman's Anodyne—**

Etherfl. oz. 4
 Alcoholfl. oz. 8
 Ethereal Oilfl. drs $2\frac{1}{2}$

Dose: One-half to one teaspoonful for pain.

Hysteria (with headache)—

Zinc Valerianategrs. 9

Tragacanth Powd.....grs. 30

Mix and divide into twelve pills.

Dose: One pill night and morning.

Ingrown Toe-Nail—

Potash Solutiondrs. 2

Wateroz. 1

Apply with pledgets of cotton. Wash with vinegar to stop the potash after it has acted enough.

Laryngitis—

Tr. Aconite Root.....drops 30

Syr. Lemonoz. $\frac{1}{2}$.

Solution of Ammonia Acetate.....oz. 2

Dose: A teaspoonful every half hour, until the skin is moist. For hoarseness with sore throat, if there is fever and a strong pulse. Good also for Bronchitis.

Lead Lotion—Sub-acetate of lead in water.**Lice—**

Corrosive Sublimategrs. 4

Alcoholdrs. 6

Ammonium Chloridegrs. 30

Rose Wateroz. 6

Apply once a day for itch or for head lice.

Lumbago (Rheumatism)—(1) Iodide of Potash.....dr. $\frac{1}{2}$

Tr. Opium Deodorated.....drs. 2

Comp. Syr. Lavender.....dr. 1

Sps. Nitrous Etheroz. $\frac{1}{2}$

Wateroz. 12

Dose: Two tablespoonfuls twice a day.

(2) Iodide of Potash.....dr. 1

Carbonate of Potash.....dr. 1

Tr. Aconite Root.....oz. 2

Wateroz. 10

For external use only. Apply to the painful part every few hours.

(3) Aspirindr. 1

Divide into twelve powders (twenty-four, for children) and put in capsules.

Dose: One capsule every four hours.

Malaria—

Quinine Sulphate	gr. 1
Cinchonine Sulphate	gr. $\frac{1}{2}$
Dried Iron Sulphate	gr. $\frac{1}{4}$
Arsenious Acid	gr. $\frac{1}{40}$

Dose: One or two after meals.

Mania, Acute—

Chlorate Hydrate	grs. 25
Comp. Tr. Cardamom	dr. $\frac{1}{2}$
Simple Syrup	drs. 2
Infusion of Cloves, to make $1\frac{1}{2}$ oz.	

Mix. This is one dose, to be taken in a wineglassful of water. Repeat in one hour if necessary.

Mania, Chronic—

Fl. Ext. Ergot	oz. $1\frac{1}{2}$
Syr. Orange Peel	oz. 1
Water	oz. $3\frac{1}{2}$

Dose: A tablespoonful three or four times a day.

Mania, Chronic—

Fl. Ext. Cimicifuga	oz. $1\frac{1}{2}$
Acacia Mucilage	oz. 1
Water	oz. $3\frac{1}{2}$

Dose: A tablespoonful every three hours.

Morning Sickness. (See also Vomiting.)—

Cerium Oxalate	grs. 20
Ext. of Gentian	grs. 10

Mix and divide into ten pills.

Dose: A pill one hour after each meal.

Muscular Rheumatism—

Ammonium Chloride	drs. 2
Ext. of Cimicifuga	oz. 2
Acacia Syr.	oz. 1
Laurel Water	oz. 1

Dose: A teaspoonful four times a day.

Neuralgia—

Salol, $\frac{1}{2}$ to 5 grs., in pill or capsule, three times a day.

Nose-Wash (see **Chronic Sore Throat**), p. 628.

Ophthalmia ("Inflammation of the Eyes")—

(1) Alum Powd.....grs. 10

Rose Wateroz. 3

Use as an eye-wash three times a day, after the acute stage.

(2) Yellow Mercuric Oxide.....grs. 5

Lime Sulphategrs. 10

Lardoz. 1

Make into an ointment and rub into the eye and along the edges of the lids twice a day, in obstinate cases. (See also page 629.)

Pharyngitis (Sore Throat)—

Quinine Sulphategrs. 12

Copper Sulphategrs. 16

Aromatic Sulphuric Acid.....dr. 1

Wateroz. 8

Use as a gargle three or four times a day.

Phthisis (Pulmonary Consumption)—

Iron Sulphatedr. 1

Magnesiagrs. 10

White Sugaroz. 1

Cinnamon Wateroz. 8

Dose: A tablespoonful after meals, as a tonic.

Plummer's Pill (Compound Calomel Pill)—

Calomel 25

Sulphurated Antimony 25

Guaiacum Resin 50

Castor Oil 10 3/10

90 per cent. Alcohol..... 3

Dose: Four to eight grains.

Pneumonia—

Opium Powd.....grs. 3

Ipecac Powd.....grs. 6

Calomelgrs. 6

Sugargrs. 30

Make into six powders.

Dose: One powder every four hours. At end of twenty-four hours omit the above, and if typhoid symptoms appear, give as a powder:

Quinine Sulphategrs. 2

Ammonium Carbonategrs. 4

If the patient is delirious or morbidly watchful, add ten drops of chloroform to each dose and give in a wineglassful of water.

Purgative Pill—Also tonic.

Aloes	gr.	I
Aromatic Powder	gr.	I
Dried Iron Sulphate.....	gr.	I
Confection of Roses, enough to make into pill form.		

Dose: One to three.

Rheumatism, Chronic (Rheumatic Joints)—

Arsenical Solution ("Fowler's Solution")	drs.	2
Iodide of Potash.....	drs.	2
Simple Syrup	oz.	3

Dose: A teaspoonful in water three hours a day, between meals.

Rheumatism. (See **Lumbago**)—

Salicin, 15 grs., as a powder every three hours.

Rickets, Scrofula, Struma—

Syr. Iron Iodide.....	drs.	1 to 2
Simple Syrup to make 2 oz.		

Dose: A teaspoonful after each meal.

Sal volatile (Aromatic Spirit of Ammonia)—

	Parts.
Strong Solution of Ammonia.....	200
Carbonate of Ammonia.....	100
Oil of Nutmeg.....	14 1/10
Oil of Lemon.....	20 3/10
95 per cent. Alcohol.....	3000
Water	1500

Dose: Given in a wineglassful of water, twenty to forty drops, to be repeated; or, sixty to ninety drops, if a single dose is to be given. Very useful as a stimulant in weakness or faintness.

Sciatica—

Ext. Belladonna	gr.	1/6
Ext. Stramonium	gr.	1/5
Ext. Cannabis Indica	gr.	1/4
Ext. Aconite	gr.	1/3
Ext. Opium	gr.	1/2
Ext. Hyoscyamus	gr.	2/3
Ext. Conium	gr.	I

Licorice Powder enough to make a pill.

Dose: One to five pills a day, as needed to give relief.

Seidlitz Powder—

A. Blue paper:

Bicarbonate of Soda.....grs. 40

Tartrate of Soda and Potash.....grs. 120

B. White paper:

Tartaric Acidgrs. 38

Dissolve "A" in two-thirds of a glass of water, then add "B,"; stir and drink before it ceases to effervesce. Should be taken on an empty stomach and repeated in an hour if it does not act then. It is best **taken immediately on rising** in the morning, and will then act right after breakfast if a dose of calomel has been taken when going to bed the night before.

Shingles (Herpes Zoster)—

Calomelgrs. 5

Sugargrs. 30

Make into ten powders. One powder every half hour. The last one to be followed by a dose of salts.

Also,

Sulphur Sublimategrs. 20

Ammoniated Mercurygrs. 30

Simple Ointmentoz. 1

Make into an ointment and apply two or three times a day.

Sleeplessness (in fevers)—

Tartrate of Ammonia and Potash.....gr. 1

Morphine Sulphategrs. 1½

Laurel Wateroz. 1

Dose: A teaspoonful every two, three or four hours.

Skin Disease (Acne)—

Magnesium Sulphatedr. ½

Aromatic Sulphuric Acid.....drops 20

Iron Sulphategrs. 3

Quinine Sulphategr. 1

Wine of Colchicum.....drops 10

Syr. of Ginger.....dr. 1

Wateroz. 1

To be taken as one dose two or three times a day. The bowels should be kept open.

Oleate of Copper.....oz. ½

Vaseline or Lanolin.....oz. 2

Apply twice daily, rubbing well in. For Ringworm.

Iodide of Sulphur.....dr. 1
 Lardoz. 1½

Make into an ointment. Apply twice a day for *Tinea favosa* ("Barber's Itch").

A cosmetic lotion for pimples, freckles and dryness of the skin.

Shelled Sweet Almonds.....oz. 1
 Orange Flower Water.....oz. 2
 Rose Wateroz. 3

Make these into an emulsion and add:

Ammonium Chloridedr. 1
 Tr. Benzoindrs. 2

Soap Liniment—

Soft Soap 8
 Camphor 4
 Oil of Rosemary..... 1½
 90 per cent. Alcohol..... 64
 Water 16

Syphilis—

(1) Biniodide of Mercury.....gr. 1
 Iodide of Potash.....dr. 1
 Distilled Wateroz. 1
 Simple Syrupoz. 5

Dose: A tablespoonful three times a day.

(2) Corrosive Sublimategr. 1
 Tr. Iron Chloride.....drs. 3
 Distilled Water to make 6 oz.

Dose: A tablespoonful three times a day.

Tapeworm. (See Worms.)

Toothache—

Arsenious Acidgrs. 2
 Morphinegr. 1
 Creosote to form a paste.

Apply on a piece of cotton batting in the cavity of the tooth.

Or,

Clove Oil	dr.	1
Cajuput Oil	dr.	1
Opium Powd.....	grs.	10
Camphor	grs.	10
Rectified Sps. to dissolve.		

Put a pledget of cotton batting, saturated with this, into the cavity in the tooth.

Trichinosis—

In the early stages the intestine should be thoroughly cleaned out by a large dose of calomel (5 to 10 grs.).

A case is reported to have been cured by good whisky. Beginning with six ounces a day and increasing to nine ounces a day, in sugar and water, given between meals. The cure was effected in eighteen days.

Urticaria (Hives)—

Benzoic Acid	grs.	10 to 20
Distilled Water	oz.	8

Use as a lotion for the itching.

Vertigo (Dizziness). When due to dyspepsia—

Bicarbonate of Potash.....	drs.	2
Tr. Nux Vomica.....	dr.	½
Comp. Tr. Cardamom.....	drs.	3
Liquor Lacto-Pepsin	oz.	1
Simple Syrup	drs.	2
Peppermint Water to make 4 oz.		

Dose: A tablespoonful in water fifteen minutes before meals.

Vomiting. (See also Morning Sickness)—

Bismuth Subnitrate	drs.	2
Dilute Hydrocyanic Acid.....	dr.	½
Mucilage of Acacia.....	oz.	2
Peppermint Water	oz.	2

Dose: A tablespoonful three times a day.

Whooping Cough—

Carbonate of Potash.....	grs.	20
Cochineal Powd.....	grs.	10
White Sugar	oz.	1
Water	oz.	4

Dose for a child: A teaspoonful every two or three hours.

Worms—

Pomegranate Root Bark.....	drs. 4
Pumpkin Seed	oz. 1
Ethereal Ext. of Male Fern.....	dr. 1
Ergot Powd.....	dr. 1
Acacia Powd.....	drs. 2
Croton Oil	drops 2

Bruise the pomegranate bark and the pumpkin seed thoroughly. Add the ergot and eight ounces of water, boil fifteen minutes and then strain through a coarse cloth. Rub up the croton oil, acacia and extract of male fern, then add them to the other, and shake thoroughly. Take as one dose at 10 a. m., having taken no breakfast and having taken a full dose of Rochelle salts the night before. This expels the tapeworm alive in about two hours.

For Round Worm:

Chenopodium Oil	dr. 1
Mucilage of Acacia.....	drs. 2
Simple Syrup	oz. 1
Cinnamon Water	oz. 2

Dose: A dessertspoonful three times a day for three days; to be repeated after an interval of three days.

PERSPIRATION OF THE FEET (HYPERIDROSIS).

Remedies—1. Washing the feet once a day in alum-water, or repeated soaking in quite warm water, will, in many cases, effectually cure their excessive perspiration. When they perspire profusely during the day, the stockings or socks should be changed during the day. This practice will conduce much to health.

2. Add a teaspoonful of salicylic acid to a pint of water and bathe the feet in it at night.

TENDER FEET AND OFFENSIVE ODOR.

Remedies—Washing the feet in alum-water will harden them. It will also remove the offensive odor to which some feet are subject. Or, wash them in a strong decoction of oak-bark. It will remove the cause that produces the bad odor, and also harden the soles of the feet. Simply bathing the feet once a day in pure water is another admirable means for the same purpose, and should be done in such cases every day, for the promotion of health, if for no other reason.

Persons subject to fetid perspiration from the feet, will derive great relief from the frequent use of a moderately strong solution of common soda, as a bath. Where a genial glow of warmth does not promptly follow the bath and friction, a little bay-rum or whisky should be applied, and the friction continued until the effect is produced.

Add a teaspoonful of salicylic acid to a pint of water and bathe the feet in it at night.

Cold Feet—The majority of people pay little attention to the cleanliness of the feet, and yet every square inch of the sole of the foot demands cleanliness, perfect cleanliness, more than any square foot of surface of the body, as far as health is concerned, because the “pores” are much larger there than anywhere else; so large, indeed, that they may be called “sluices” for carrying away the impurities of the system. Hence, the bottom of the feet should be well washed every day. It is well to have two pairs of shoes and wear them day about. This overcomes most foot troubles and is healthful.

For Aching Feet—Soak for ten minutes in very hot brine, and wipe dry, without washing off in clear water. This will afford speedy relief.

Chlorodyne.—There are few remedies which have proved more general favorites than the above. It is said to consist of prussic acid, in combination with morphia, chloroform, and Indian hemp as its principal components, and it possesses, combined in an eminent degree, many of the best properties of an opiate and an antispasmodic. It is agreeable to the taste of many persons, and can be given either alone in water, or combined with other remedies. Perhaps its greatest value has been in cases of irritating cough, as in consumption, and in irritation of the bowels, accompanied by pain and diarrhœa. In the former case, five or ten drops in an ounce of camphor mixture three times a day; and in the latter, the same dose in an ounce of chalk-mixture may be given. In cases of acidity, with much irritation of the stomach, an excellent prescription is, ten or fifteen drops of chlorodyne with fifteen to twenty grains of bicarbonate of soda, in a wineglassful of water, two or three times a day. From its warm, aromatic taste, and comforting action in cases of griping and uneasiness in the bowels, it is generally a favorite remedy with patients. Either alone, or combined with other remedies, it has proved of eminent service in cases of sea-sickness which have resisted many other kinds of treatment. It has been extensively used, both in this country and abroad, by domestic as well as by regular practitioners, in the treatment of diarrhœa and dysentery, and it has been authoritatively stated that it is one of the best of known remedies for cholera. One thing is certain, that its uses are so varied and general that it should form part of the equipment of every domestic medicine chest. Chlorodyne of known composition can now be obtained, so that those who have a very proper objection to using remedies, the constituent parts of which are kept secret, may employ it without further scruple.

Of course, as it has the action of a powerful opiate, it must be given with extreme caution to young children, and in all cases where opiates are likely to exert an undue action.

INSTRUCTION SEVENTY—Tonics

Tonics and Other Remedies

For Special Diets for Various Diseases, see Vol. 1, pages 318 to 403.

Tonics are remedies which improve the health, muscular tone or vigor of the system; many medicines, properly so-called, possess this power, and are, therefore, classed as tonics; but other means of health, both mental and physical, are included.

When an individual is in good health, the muscular fibre throughout the body, both voluntary and involuntary, possesses a certain amount of tone, or tonicity, the flesh feels firm, and the actions performed in obedience to the will are effected regularly and decidedly. When, on the other hand, the health becomes impaired, the muscles and fibers generally become flabby and incapable of continued exertion, but are sometimes irritable, with the tremulousness of debility. These changes in tone are most strikingly manifested in children, in whom they take place with great rapidity; every mother or nurse is practically aware of the fact, and judges greatly and rightly of the health of her young charges by the firmness of the flesh. Tonics, therefore, are remedies which tend to correct the want of the tone above described by exciting the reverse or tonic condition. In this way food of particular kinds may be regarded as tonic. The "condition" of the horse, as all know, is a state in which the muscular power and endurance is augmented to a high pitch by means of the stimulant power of dry grain food, in contrast to the comparatively weak muscular tone which can be obtained from green food.

Indeed, if the word tonic be taken in its widest sense, it would include a vast number of agents; medically, however, it is used more restrictedly.

The medicinal tonics may be classed as—

Tonics which act directly by influencing the **stomach**, and increasing its digestive powers.

Tonics which act indirectly, by passing into, and exerting their influence through the **blood**.

The first, or stomachic tonics, are chiefly the vegetable bitters; of these the most important, at least in a domestic point of view, are—

Calumba,
Chamomile,
Cinchona Bark,
Gentian,

Hops,
Quassia,
Salicine.

To which are to be added the mineral acids. The second, or indirect tonics, including nervine and vascular tonics, comprise **iron** in its various preparations, animal and vegetable **oils**, preparations of zinc and copper, quinin, nux vomica, and arsenical salts, to which, perhaps, may be added the vegetable acids.

The non-medicinal tonics are—

Cold in its various forms and applications.

Exercise and fresh air.

Mental emotions of a pleasing and stimulating character.

From the above, it may be seen that the action of a tonic is of a stimulant or excitant character; it is, however, distinguished by its permanency, in contradistinction to the transient action of stimulants proper. In order, therefore, to insure the proper action of a tonic, it is requisite to administer it in small doses, which do not cause appreciable stimulation, and at short intervals, once, twice or three times, according to circumstances, in the 24 hours. At the same time,

there is a limit to the use of tonics; some, such as iron, if too long continued, are apt to occasion uncomfortable sensations in the head and elsewhere, and bitter tonics, if given regularly for a length of time, at last tend rather to weaken than to strengthen the digestive powers. On this account, "bitter beer," although a most excellent beverage and tonic in some states of the system, may, if taken **too continuously**, tend rather to mischief than benefit. As the employment of tonics in different affections and states of the body is entered into in the individual articles, it is unnecessary to pursue the subject further here.

Iron is used internally for anemia (deficiency of the red coloring substance of the blood, which is also the oxygen carrier). The following points are very important: 1. Iron may disorder the digestion even of a healthy person, because it decomposes the gastric juice more or less, especially in large doses. 2. After an exhausting disease iron should not be given until the digestive powers are restored. 3. Begin then with the mildest preparations. 4. And give it only after meals, within 20 to 30 minutes, so that the food in the stomach will protect the latter. It is apt to blacken the teeth when given in liquid form, but this is avoided by taking it through a glass tube, which carries it past the front teeth. Iron taken internally tends to cause constipation and it blackens the stool by combining with sulphur which is present in the food.

Santonin, a white, resinous, crystalline powder, is an infallible remedy for "round worms," that is, for the long round worms, like earth worms in shape, which are so commonly met with, especially in children. The dose of santonin is from 2 to 6 grains. It is tasteless, and may be taken in milk, or between thin slices of bread and butter. It should be given when the stomach is empty, best late in the evening after an early tea. Three doses may be administered at intervals of 12 hours. The powder may be mixed with an equal quantity of sugar of milk, or it may be given alone as above.

Nothing could be more certain than its action in killing or poisoning this kind of worm. After having taken a few doses of the drug things appear of a greenish-yellow color. Patients may be much distressed lest this should continue permanent. It never does so. The urine is tinged of a citron yellow color and stains the linen. Altogether we must look upon santonin as one of the most valuable of medicines, inasmuch as, by so effectually and speedily getting rid of these worms it is often possible to cure patients of fits, and other affections, of which these worms have been the perhaps unsuspected cause. Moreover, the worms are dangerous in themselves, as they have been found perforating the walls of the bowels, and causing death. Their effect, too, upon the general health of children, as well as adults, is oftentimes most pernicious. Patients troubled with them complain of pain in the region a little below and to the right of the stomach (i. e., in the bowel next to the stomach), of sickness, and often of a peculiar sensation of "rising in the throat," with sickness, and tendency to vomit. Sometimes fainting fits, and other nervous seizures occur at intervals. After a dose of purgative medicines one or more worms are sometimes passed, in which case a dose of santonin should at once be given. They are sometimes vomited also, but most frequently their presence remains undetected, till the continuance of such symptoms as those noted above induces a medical man to suspect their existence, and he prescribes for them accordingly. Santonin has no destructive effect on the tape worm or on the thread worm.

The following prescription may be made use of by an adult, and for a child

one-half or less may be given: Take of santonin 8 grains; sugar, or sugar of milk, 15 grains; mix, and divide into three powders. One powder to be taken every night, till the three are finished. A dose of castor oil, or some simple aperient, should be given afterward if the bowels do not move of themselves.

Senna, as a purgative, is safe, certain, and convenient, and deservedly holds a high place among domestic remedies. It is a pure aperient, does not depress or debilitate, and is admissible in most forms of disease, and at all times of life. Senna may gripe, an effect generally of faulty preparation, or of the admixture of the argel leaf. This leaf is more fleshy, thicker than true senna. It has no prominent veins and is symmetrical at its base, while senna has prominent veins and one edge of the leaf runs down below the other on the stem. Senna is generally given infused; if time permits, the infusion may be made with cold water, which in the course of a night, will fully extract the purgative principles of the leaf. When quicker preparation is necessary, the infusion may be made with hot water, like common tea, but should **never be boiled**; the higher the temperature employed in preparing the senna infusion, the more likely is it to gripe. Additions, such as ginger, caraway, etc., are frequently made to senna to prevent griping, and sugar is often added for the same purpose; this is better rectified by attention in preparing, and no addition covers the slight nauseous taste of the drug so effectually as a small portion of common black tea infused along with it, with or without the addition of a little milk and sugar. Besides infusion, senna is given in the form of confection, tincture, and syrup; but none of these preparations are so actively certain as the infusion, and they may disorder the stomach. The extensively used "German" or "Persian" powder owes its laxative properties chiefly to powdered senna; it is an excellent preparation.

The common combination of Epsom salts with senna infusion, or, as it is called, "black draught," forms a very active purgative, but is only suitable for the strong. The average dose of senna is a quarter of an ounce, infused in rather less than a breakfast-cupful of water; this will make a teacupful of infusion, and be a suitable dose for a child 10 years of age. Confection of senna, the old "Lenitive Electuary," agrees well with some persons as a habitual aperient, particularly if they are liable to piles. It is also an agreeable form in which to administer the drug to children. The dose is 2 drams or teaspoonfuls.

Dover's Powder.—One part opium, 1 part powdered ipecac, 8 parts sulphate of potash—all well mixed together. Ten grains contain 1 grain of opium. This powder is often used to cause sweating and to relieve the aching pains and fever of a fresh cold. It will often cut short a severe cold. The dose is 5 to 15 grains for an adult.

Purgatives are medicinal substances which excite and accelerate the muscular movements of the alimentary canal, and increase the discharge therefrom. For the sake of convenience, under the head of purgatives, aperients generally are treated of. These are divided into:

Laxatives—Purgatives—Drastic Cathartics. A further class of "hydragogue" cathartics is also recognized. Laxatives, which gently increase the natural movements of the bowels may be arranged as dietetic, mechanical, and medicinal. Dietetic laxatives are chiefly vegetables and fruits of various kinds, honey, treacle, preparations of

the grains, cold water, malt liquors, bacon, etc., but many of these act mechanically also. Most succulent vegetables and fruits act upon the bowels by virtue of their peculiar nature and also by the mechanical bulk of their refuse or indigestible part (chiefly cellulose). Of the mixed dietetic and mechanical laxatives, the farinacea or grain substances are the most important; these owe their property entirely to the presence, either whole or ground, of the external covering of the grain, as in the case of bran bread, or of Scotch oatmeal. The flour of the Egyptian lentil, or *Revalenta Arabica*, is almost medicinal in its power of relaxing the bowels. The seeded fruits, such as currants, gooseberries, etc., are mixed dietetic and mechanical laxatives.

The purely mechanical aperients are not numerous; whole mustard seed, and the common dried currant, as it is often given domestically, are examples.

Injections may be classed under the head either of purely mechanical or of medicinal aperients, according to their nature (see *Enema*). The following table includes the principal aperient and purgative medicines which may be used domestically:

I. Laxatives.

Almond oil.
Cassia pulp.
Cream of tartar.
Honey.
Magnesia.
Manna.
Olive oil.
Phosphate of soda.
Prunes.
Sulphur.
Tamarinds.

II. Cathartics—Drastic.

Colocynth.
Scammony.

III. Purgatives.

Aloes.
Castor oil.
Epsom salts.
Euonymin (according to dose).
Glauber salts.
Iridin (according to dose).
Jalap.
Rhubarb.
Tartrate of potash and soda.
Senna.

Mercurials { Blue pill.
Calomel.
Grey powder.

The two cathartics put down may be used domestically,—indeed, the first is every day used in the form of the compound colocynth pill. Croton oil, elaterium, gamboge, and podophyllin are included in the drastic cathartics; but, except under peculiar circumstances, ought only to be administered by a medical man.

Purgative or aperient medicines are much more generally used both by medical men and the public, than any other form of remedial

agents, but while their value is great, they are, and have been, very greatly abused. It has been sufficiently explained how the food mass, after undergoing its principal digestion in the stomach, is gradually propelled through the entire tract of the bowels, and how, during this propulsion, its nutrient constituents are absorbed from it, the refuse being left for discharge; the discharge from the bowel does not consist simply of the food refuse, but contains also various secretions and excretions thrown out into the bowels from the general system, which excretions cannot be retained in the system without injury to health.

From these considerations it must be clear how great the importance, not only that the bowels should be active as regards the excretions into them, but as regards their own discharge, both of these excretions and of the food refuse. When the bowels are inactive in these respects, the state is termed **constipation**, or costiveness.

Under **Constipation** will be found an explanation of those general remedies which are most useful in removing the condition; and, indeed, when they prove sufficient, are certainly to be preferred to medicinal agents; when they do not prove sufficient, either as temporary or permanent means of relief, the purgative or aperient medicines must be employed—under the general rule that they should never be used stronger than requisite. By this it is not meant that because manna, or sulphur, or magnesia are classed in the laxatives, they are always, when possible, to be substituted for the purgative aloes, or castor oil, or rhubarb, or senna; such a distinction could not be observed without other and greater counterbalancing inconveniences; but the rule should be, that relief to the bowels is to be afforded with as small an amount of purgative action as possible, unless that purgative, or, in other words, lowering action, is called for as a part of the treatment, as it is in persons of very full habit of body, etc.

Where aperient medicines are either taken or given domestically, there is often too little care in the selection: unless it be in pregnancy, or in consequence of individual experience, the idea seems to prevail with many that one aperient is as good as another. This is far from being the case.

Except in persons whose bowels are very easily acted upon, or in such cases as those where the aperient is taken rather to give additional action than to open the bowels, the "laxative" aperients are scarcely sufficient as general aperients; those classed as purgatives, and the cathartic colocynth, under the form of its well-known compound pill, are in daily use.

There are few ailments in which increased action of the bowels is called for, in which one or other of the aperient remedies in the list will not be applicable. Aloes is valuable for certainty of action on particular portions of the bowels, for the small bulk of its general dose, for its tonic bitterness and continued effect even after frequent repetition, but it must be used carefully in pregnancy, piles, and other affections situated about the lower part of the canal. Castor oil is safe in almost all cases, has certain, perfect action, and like aloes, does not lose effect by repetition; but, unfortunately, it is too often the medicine most disliked and sickened at. It is one of the greatest desiderata in medicine to obtain an article which should combine all the advantages of castor oil with a less disagreeable taste, and with less tendency to cause sickness, as well as being less bulky. It has been sought for in vain among the numerous oils belonging to the same natural family, for although some of them are very good, they are uncertain in their action.

Epsom salts require much discretion in use, but have deservedly thrown Glauber salts into disuse. Jalap is certain and active, but is apt to gripe and to sicken, and its bulk is an objection. Mercurials alone, or followed by castor oil or senna, or combined with aloes, rhubarb, or colocynth, although most valuable, are most abused. Rhubarb, mild, and with some persons effectual, is also tonic, but is apt to heat, and its bulk and taste are an objection, especially with children. Rochelle salts, similar to Epsom salts in action, is pleasanter. Senna (see special article), the medicine of the nursery, is invaluable, and if properly prepared, is safe and certain.

Colocynth, in its well-known compound pill, forms part of the most generally used and useful purgative in costive habits. Scammony is, in many of the affections of children, especially when combined with a mercurial, our most valuable purgative, and is recommended by the small bulk of its dose.

Purgatives, however, are used, not only as a means of clearing the bowels of their contents, but also as agents for the relief of those organs, such as the liver, which are closely connected with the bowels; and further, as remedies calculated to relieve distant parts, or the system generally. Thus, in many head affections, free purging is one of our most powerful remedies; in congestion of the liver it is most serviceable; in overfulness of the system at large, it relieves greatly. To the above fact, nature strongly points in those cases in which sudden and striking relief often follows an attack of spontaneous purging or diarrhea.

The abuse of aperient medicines owes its origin, probably, to a variety of causes. Constipation, either alone, or as a concomitant of disease, is so obvious and common a symptom; it so often occasions distress, or at least uncomfortable sensations, its removal is generally so simply effected, and often is so sensibly felt as a relief, that it cannot be matter of surprise if both doctor and patient, habitually almost, look to the action of the bowels by purgative medicines as almost the requisite preliminary to all other treatment, and within certain limits they do right; but the fatal facility of the treatment, assisted moreover by the powerful advocacy which it has received in years gone by, has certainly produced a far too general use of aperients as purgatives, not simply in the treatment of acute disease, but as a general rule of daily life. If the question be put—Which is the greater evil of the two, to have the bowels habitually confined, or habitually to take aperient medicines? there can be no question, if the choice **must** lie between the two evils, that the latter is the lesser one; but there are few cases in which the choice is so circumscribed. The bowels probably are confined, but they are so because the general conditions requisite for their healthy action (see **Constipation**) are neglected, and because the aperient medicine is used as the readiest substitute for a little trouble and perseverance. Thus used, the aperient is abused, and injury, more or less, is inflicted upon the system, according to the nature of the medicine, the frequency of its use, and the strength of the dose. One most general effect of the abuse of aperients, is the weakened digestive power of the stomach, another, the weakness of the system at large; and a third, not unfrequently, is continued irritation of some portion of the alimentary canal. The weakened digestion which follows the abuse of aperients may not be obvious at first; indeed, if the digestive organs have been overloaded and oppressed, instead of being weaker after an aperient, they are actually more active, and this apparent increase of activity is very apt to lead to a too frequent renewal of the remedy, and too often, trusting in the remedy, to a continuance of those habits of excess which caused the first disorders. The debility of the system which follows the abuse of aperients is the natural result of the digested food mass being hurried too rapidly through the bowels to admit of its nutrient portion being taken up and conveyed into the system; debility is also the result of the too frequent employment of purgatives, such as the salines, which increase unnecessarily the discharges, especially of the serous portion of the blood, into the bowels.

Diuretics are medicines which increase the flow of urine. The

class embraces very many substances, but it will be sufficient to notice only those which may be most safely and generally used; they are:—

Broom.
 Dandelion.
 Fir Top,
 Gin,
 Juniper.
 Parsley.
 Potash—Solution, or Liquor Potassæ.
 “ Acetate.
 “ Bitartrate, or Cream of Tartar.
 “ Carbonate.
 “ Nitrate, or Saltpetre.
 Soda—Carbonate.
 Spirit of Sweet Nitre.
 Spirituous Liquors.
 Squill.
 Turpentine.

Some of these act directly on the kidneys, e. g., saltpetre; others raise the blood pressure, and so increase the flow of urine.

There is always some degree of uncertainty in the action of diuretic medicines, but with some more than others. The two first on the list—broom and dandelion—are as certain as any others, and, as domestic remedies, they have the advantage of being easily procurable and of being perfectly safe. Fluids should be given freely during the action of diuretic remedies. It sometimes happens that diuretics, which would not act before, act after the administration of an active purgative. Mental emotion, such as fear, and nervous disorders, such as hysteria, it is well known, will give rise to great increase in the flow of urine. The patient should drink plenty of water; indeed, water alone in large quantities is one of the best and safest diuretics.

Chronic Sore Throat—

Soda Bicarbonate	drs.	2
Borax	drs.	2
Carbolic Acid	drops	10
Glycerine	oz.	½
Water	oz.	8

Mix and use one-fourth of this much to wash out the nose with twice a day. The solution should be put in a cup and drunk (or

drawn into the throat) **through the nose**, and then allowed to run out of the mouth. Do not blow your nose for five minutes after using a nose wash, as there is danger of forcing the liquid into the ears.

Seasickness.—Take a cloth (handkerchief or towel) wrung out of as hot water as can be borne and bind it firmly round the patient's head. He must lie flat on his back and no other remedy should be used during this treatment. Renew the hot cloth before it cools and keep up this treatment for one-half to four hours. The relief is complete and permanent for the voyage.

Another remedy is 1-120 grain of atropin together with 1-60 grain of strychnine; this dose should be given (by mouth or hypodermically) a half-hour before the boat sails, or whenever seasickness comes on. The dose may be repeated, if necessary, once or twice at intervals of two hours.

Eye Remedy:

- One grain of zinc sulphate.
- One dram of wine of opium.
- One ounce of distilled water.

Mix. Put a drop in the eye two or three times a day if the eyes are inflamed or have been exposed to dust. This is an excellent eye tonic and it is quite safe to use.

Pain in the Side.—This very common affection arises from a great variety of causes. If situated high up, in the region of the chest, it may be occasioned by inflammatory affection of the pleura or of the lungs, but in this case will be accompanied with more or less fever, and other symptoms indicative of the disorder. It may, however, be caused, in the same situation, by a kind of rheumatism, or neuralgia of the muscles connected with the ribs. In this form there is not, generally, fever, and the usual signs of affection of the lungs are absent; the pain, moreover, is much more liable to aggravation by pressure externally, and by slight movement, than that of inflammation of the lungs. The affection requires, chiefly, the local treatment of rheumatism; bran poultice, and anodyne and turpentine liniment. The above pains may of course occur on either side of the chest. Pain on the right side, lower down, may be owing to affection of the liver; on the left side, to affection of the spleen. Pain on the left side, however, often occurs as a sympathetic affection, sometimes of the heart or lungs, in either sex. It is most common in females, and is then very often sympathetic of disorder, functional or otherwise, of

the womb. Any person becoming the subject of continued pain in the side should have the causes investigated by a medical man.

Chapped Hands, so troublesome to many in frosty weather and during cold dry east winds, may partly be avoided by care in thoroughly drying the skin after washing. The following lotion is useful: Take of borax two scruples, glycerine half-an-ounce, water seven and a half ounces. This may be used twice a day. An ointment prepared with Goulard solution, oxide of zinc, and glycerine, a drachm of each, with two ounces of lard or vaseline, makes an excellent application, and may be used every night. For this very common complaint use:

Benzoate of zinc.....one drachm
Oil of almonds.....one drachm
Cold cream.....one ounce.

Mix. To be applied to the hands every night.

Or,

Oxide of zinc.....one drachm
Carron oil.....half-an-ounce
Simple ointment.....half-an-ounce

Mix.

Vaseline, either alone or with a small quantity of sugar of lead added to it, is very useful, and ought to be applied to the hands of those who suffer much in this way, after each time they are washed.

Those who are obliged, from the nature of their occupation, to wash their hands frequently, are the great sufferers from chaps, the chaps or cracks themselves becoming dangerous, in some occupations, from their liability to absorb poisonous substances into the blood.

Burns, Scalds, Frostbite, Sunburn or Blisters are soothed and healed by Carron oil (equal parts linseed oil and limewater); or a better lotion is made of olive oil 5 parts, limewater 4 parts, "formolid" (or listerine or glycothymoline) 1 part, **well shaken together** and freely applied to the sore part, which is then to be covered with clean lint or with sterilized absorbent cotton batting. Repeat the application three or four times a day.

A moist dressing (water saturated with picric acid) is excellent for burns.

Limewater alone is **excellent**. It is made by putting a piece of fresh slaked lime in a glass jar or bottle with water and shaking. The first jarful should be thrown away, pouring off all but what settles to the bottom when the bottle has been standing five minutes.

This may be done a second time and the jar again filled up. This gets rid of impurities. After filling the jar the third time, shake it again and then let it stand till clear. The "limewater" is the part left clear by the settling of the undissolved lime. It will keep a long time.

Dissolve two ounces of alum in one pint of hot water, saturate cotton cloths with this solution, and keep the burn well wrapped in them. The pain will **quickly** cease, and the process of healing will soon commence.

Sprinkle the burned surface with common baking soda, and cover it with a wet cloth. When the burn is only superficial, the pain will cease immediately, and but one application is needed; where the injury extends deeper, longer time and more applications will be required. This is a speedy and very effective cure for burns.

The following are good remedies: Tea leaves, steeped and applied; the white of an egg, applied by means of a feather brush, or wisp of old muslin. As soon as the first layer dries, another should be applied. Oil of peppermint will relieve the moment applied and cure the burn. Syrup or molasses applied to the burn is an excellent remedy and affords instant relief. The application of common indigo bluing will extract a burn almost instantly. Dip a cloth in the bluing and apply to the burn, or press with a wet blue-bag.

For an extensive burn or scald there is, perhaps, **no better remedy** than pure hog's lard. To prepare it take a cupful of the best lard and put it in a vessel of hot water, boil a few minutes, stirring at the same time, until all the salt and alum that were put in to bleach it have been washed out. Then allow it to cool until the floating lard hardens; then collect it and put it in a bowl, which, in turn, is placed in a vessel of hot water on the stove, and kept there until the water in the bowl has been driven off. The bowl of lard is heated by surrounding water to prevent cooling. One part of benzoic acid to thirty of the lard is to be added with stirring to prevent its becoming rancid and to make it much more healing. It can then be put away in suitable vessels, until required for use. Apply once a day.

For a bad burn, when the skin is removed, cover the part with a fine quality of cotton wadding (absorbent cotton batting) applied to the burn, dipped occasionally in a weak solution of carbolic acid (one part in one hundred) to remove the odor. Let it remain until it drops off. The carbolic solution should be squeezed out of the dressing, as it is poison and burns readily.

Quinsy.

In this, abscesses form in the tonsils, the temperature is very high, the pulse very rapid, and the sufferer quickly becomes exhausted. There is soreness and dryness of the throat, with acute pain on swallowing. One or both sides may be affected. The tonsils are red, the swelling and redness are marked, extending to surrounding parts. The patient may be unable to open his mouth. In two or three days the abscess "points," and, if not opened bursts into the mouth, discharging large quantities of matter. Great relief follows at once.

Treatment.—Poultices and hot applications are not only far pleasanter than cold, but also hasten the inflammation and bring relief sooner. As soon as the tonsil becomes at all soft, it should be opened. This should be done only by a physician, as a large artery lies very close to the tonsil and may be cut in opening the abscess in the tonsil.

The patient should at once be put to bed, when the swelling first commences. The diet is necessarily liquid. Otherwise the treatment is the same as in simple tonsillitis. Tonics should be given afterwards to build up the patient's strength.

Freckles.

These are defects of pigment in the skin. To remove, use any of the following:

1. Make a paste of English mustard and lemon juice; apply to the face four nights in succession, washing off each morning. The freckles will disappear and likewise the redness.

2. Take one-half teacupful of rain water and two teaspoonfuls of powdered borax, and with this wash the parts twice a day.

3. Two teaspoonfuls of lemon-juice, one of powdered borax and one of sugar; mix, and let stand a day or two. Apply once or twice a day.

4. The milky juice of the stem of the dandelion will remove freckles. It should be applied twice a day.

Cold Cream is a pleasant cooling ointment, made by melting 4 ounces of white wax in a pound of almond oil, by means of gentle heat, and mixing gradually with a pint of rose water in a warm mortar.

Blister.—The term is applied either to that which causes effusion of serum—the watery portion of the blood—underneath the scarf or outer skin, or it is used to denote the effect itself, that is, the bag or vesicle containing fluid, which is formed. There are various methods of producing blisters on the skin, in fact, any powerful irritant may have the effect. Steam, boiling water, strong ammonia, mustard, and many other irritants have the power of raising blisters, and are used for the purpose by medical men; but by far the most convenient, certain, and generally adopted agent is the *Cantharis vesicatoria*, or Spanish fly. The most usual form in which this is used is the common blistering plaster, which, being spread upon leather, or some other material, is applied to the skin. The most convenient, elegant, and sufficiently efficacious applications, if properly applied, are the blistering tissues or papers.

The very efficient blistering tissues now manufactured are light, almost free from smell, are removed with the greatest ease, are not liable to affect the kidneys or bladder, and are remarkably well suited for children. In applying a blister to any portion of the body, the first care must be **to ensure accurate contact with every portion of the surface it is intended to affect**, the fitting to irregularities being ensured by snipping the edges; and all hairs, whether about the head and face, or elsewhere, are to be shaved off clean, just before the blister is put on. In the case of the paper blisters, it is better to add the weight of a folded napkin placed about them. If the old form of blistering plaster be used, the cantharides ointment should be spread on leather or adhesive plaster according to the prescribed size, leaving half an inch of margin bare. A few drops of oil rubbed over the surface will increase its activity, and facilitate its removal; this, however, is still better ensured, and the injurious effects apt to follow the use of this preparation prevented, by a piece of thin muslin between the plaster and the skin. The evening is generally the best period for the application of a blister, which, on an average, takes twelve hours to rise well, but sometimes much longer, especially in those who have very dry skins, or are far advanced in life, or when there is much nervous depression. In children, and in those of very delicate skin, the time is much under twelve hours. In the former the action of a blister ought to be closely observed, the more so the younger the child, and the application removed as soon as it begins to rise; a soft bread poultice being then substituted, and kept on for a few hours, full rising will take place. When a blister has well risen, the plaster being removed, and a cloth placed so as to catch the fluid, the vesicle or bag is to be punctured at the most dependent part by the point of a penknife, or with a pair of scissors, and the thin skin which has been raised allowed to subside unbroken, and the dressing applied. If there are more vesicles than one, each must be punctured, unless very small. It sometimes happens that instead of watery fluid, blisters contain a jelly-like matter, which will not run out; no attempts at squeezing should be made in such a case; if the dressing be applied, gradual oozing will drain the vesicles.

Very various methods of dressing blisters have been proposed and practiced, that more generally followed being by means of lint and linen spread with lard, or simple cerate or spermaceti ointment. Prepared cotton wool is probably the pleasantest dressing that can be used, and is the one now usually preferred. If properly applied and

left undisturbed, no further dressing beyond the first need be required. When a blister, from mismanagement, or any other cause, becomes inflamed, or as it is popularly called, gets "the fire in it," a soft bread and milk poultice applied for a few hours will give great relief. Blisters should always be healed; the custom of dressing them with irritant ointments to keep them "open" is at once barbarous and injurious; the teasing pain, by its irritating effect upon the nervous system, does much harm. If continued counter-irritation is required, it is much better to apply a succession of small blisters, not on, but close to the same spot. "Flying blisters" are blisters which are taken off as soon as the skin is reddened and irritated—a diluted mustard poultice answers much the same purpose.

Blisters are often applied domestically, without medical advice, but often injuriously during the continuance of acute inflammation and fever. In such cases, especially when put on just over, or very near, the affected part, they do harm, they increase general fever, and may aggravate instead of relieving the local disease. This error is frequently perpetrated in cases of acute inflammation affecting the throat, or in pleurisy, when a bran poultice would be much more serviceable. In persons who are suffering under, or who are liable to, affections of the kidneys, blisters must not be used, except under medical sanction, and that will be given in but few cases. Persons are sometimes needlessly much alarmed at the fact of a blister not rising. Unquestionably, such a result may be owing to extreme and fatal depression, but is quite as frequently due to trivial causes.

INSTRUCTION SEVENTY-ONE—*Old Age*

Guide for Those Approaching Old Age

The Time When Vigor of Life is Giving Way and
Effects of Excesses in Early Life Add to
Natural Infirmities.

*Commencing With Women at Age of Fifty-three and Men at
Age of Sixty.*

Subject Reference

For "*No Reason
Why Man Should
Not Live One
Hundred Years,*"
see page 512.

*Foods for People
of Various Ages,*
see page 670.

Natural Infirmities.

Old Age. — The period of incipient old age is usually in women about the fifty-third, in men about the sixtieth year; after this, it generally becomes evident that the vigor of prime is giving way, and that the powers of the constitution are no longer able to recruit themselves, or to sustain exertion with the same ease as formerly; diseases, too, peculiar to this stage of life, begin to show symptoms of approach,—symptoms which can scarcely be too soon detected, or too carefully watched. As time goes on, the individual becomes more dependent upon the affectionate care, and (equally important), the intelligent supervision of those in charge. The subject of the treatment of the aged has been a neglected one. Old age increases the liability to such hereditary diseases as gout, gravel, rheumatism, apoplexy and paralysis; and in women, especially, to cancer. Now the effects of excesses and of dissipation in early life, which may have been unfelt during the vigor of manhood, too often add to the natural infirmities. Whatever may have been the previous modes of living, it is always a dangerous experiment to make any material or sudden change in them after age has begun to tell upon the constitution, — it should not be done but for important reasons, and under direct medical control. The natural sensations will guide the individual to those modifications of previous habits, which accord with the altered structures and diminished powers; and this more particularly in the case of active or violent exertions, which the hardening and ossification of the various tissues, but more particularly of the coats of the arteries, render hazardous. The weakened digestion of advanced life should be considered in the food, which, while it is nutritious, ought at the same time to be lightly cooked, and everything like hardening avoided. Where the teeth are deficient, meat should be well divided, either by mincing before cooking or by the knife after. The table mincer is of immense assistance when mastication is defective. The meals

should be light, not at too long intervals. If the dinner be early, as it ought to be for the aged, a light supper should always be taken. The skin of old people is often most shamefully and disgustingly neglected, and no point is more closely connected with their comfort and health; it should frequently be sponged with tepid water, and well rubbed afterwards with a rough towel to promote reaction. It ought at the same time to be carefully protected by woolen clothing; old people are most susceptible of the changes of external temperature, particularly cold; indeed, a fall of a few degrees in the thermometer may be the immediate cause of death in very advanced life, and the average number of old people affected by apoplectic or paralytic seizures, is apt to be notably increased at the setting in of frost. Exercise by the old should be continued as long as they are able to take it, but never should it extend to fatigue. Sleeplessness, so frequently and loudly complained of by aged people, is, in some respects, natural; as life advances, nature would seem to require less of the soft restorer. It is not well to endeavor to overcome it by narcotic medicines. If possible, the time of sleep should, by habit, be kept to the early hours of the night, and, in summer especially, the tedium of the early morning may be relieved by reading, knitting, sewing or some other light employment, even in bed. In advanced life, the urinary organs require the greatest care, the call to relieve them should never on any account be delayed; on the slightest symptoms of derangement, proper medical advice ought to be taken at once, it may prevent evils which too often render the later years miserable. It is most important for old people to give themselves time to empty the bladder thoroughly; they do this with more difficulty than the young. The medicines prescribed for the aged should be, whenever it is possible, of a warm character, to counteract the tendency to flatulent distention: large doses of mercurials, salts, strong purgatives, are all to be avoided. Alkalies, even when given to counteract a tendency to the acid of gout or gravel, must be carefully watched, and not too long continued; they may produce the opposite state from that which they are intended to correct—a much greater evil. Pills, especially if at all hard, are apt to pass through the bowels unchanged. When an aperient is required by an old person, none is more suitable than a moderate dose of infusion of senna, to which a little ginger, or a teaspoonful of bark, or of gentian is added. Six to eight drachms of the compound decoction of aloes answer well, if there is no great tendency to piles. When the bowels are habitually constipated, an injection of a pint to a pint and a half of warm soap water, must be given occasionally as required; this counteracts the great tendency to fecal accumulation. The doses of medicine ought always to be diminished after the period of incipient old age.

INSTRUCTION SEVENTY-TWO—*Patent Medicines*

Warning As to Purchase and Use of Patent Medicines and Drug Foods

With Table Giving Alcoholic and other Analysis of their
Approximate Constituents (1918).

There seem to be several perceptible reasons for the widespread use of proprietary medicines. In the first place, many people, from carelessness in diet, overwork or worry, allow themselves to run down and, while not quite sick enough to consult a physician, are attracted by the specious advertisement of some popular cure-all. The symptoms detailed appear wonderfully like those of the interested reader and he forthwith resolves to try a bottle or two; it might fix him up, he argues, but if not, no harm would result. If he is a persevering subject he sticks to it and, in the words of the advertisement, gives it a "good, fair trial" until either disgusted or cured. If his perseverance is rewarded, and he luckily strikes something which he thinks has cured him, or, as is more likely, **he has** become better in spite of it, then he considers himself a clever fellow, and **in** his delight publishes his cure far and wide. Thus we hear of the successes only; the failures are buried in obscurity.

Then there is a large number of people who are fond of drugging themselves as a sort of amusement, cranks on the latest patent medicine. These people always have something new wrong with them, and not only do they take the nostrums themselves, but are extremely fond of recommending them to others.

There is a third class which takes these medicines because they like them, for their stimulating, sedative or other effects. Thus, in temperance states, in the northwest, and among Indians, certain remedies are quite popular. For instance, Peruna is said to be a popular society beverage. Many of the bitters, tonics, malt extracts and peptone preparations are taken for their alcohol content. I have been informed that old people who take Paine's Celery Compound do not seem to be able to stop using it. One individual takes several dozen Radway's Pain Killer every month. At Niagara Falls the negro population use a great deal of Dr. Agnew's Catarrh Cure for the effect of the cocaine present. Some of the peptone preparations tested were pronounced by experts to be almost as good as sherry.

It is a well-known fact that if a statement be repeated often enough one eventually almost believes it against his better judgment. Of this psychological fact the patent medicine vendor takes advantage; he advertises, and the most systematically and most widely advertised remedy is the best seller—if it is not too hard to take. If a colored and flavored water were put on the market and advertised it would sell, and testimonials by the thousand would be obtained.

The claims of some of the proprietary medicines on the market today are preposterous; some are little short of criminal in the assertions they make. And yet people in other respects normal will swallow both the advertisement and the medicine.

The following instances will serve to show what "patent" medicines commonly contain:

Baker's Stomach Bitters has 43 parts alcohol in 100 parts.

Hostetter's Stomach Bitters has 44 parts alcohol in 100 parts.

Richardson's Concentrated Sherry Wine Bitters has 47 parts alcohol in 100 parts.

Whiskol, said to be "a non-intoxicating stimulant, whiskey without its sting," has 28 parts alcohol in 100 parts.

Colden's Liquid Beef Tonic, "recommended for the treatment of the alcohol habit," has 27 parts alcohol in 100 parts.

Hooftland's German Bitters, said to be "entirely vegetable and free from alcoholic stimulant," has 26 parts of alcohol in 100 parts.

Parker's Tonic, "purely vegetable, recommended for inebriates," has 42 parts alcohol in 100 parts; and so on with all this class of quackery. Good whiskeys contain about the same amount of alcohol as the above and are very much cheaper if you want them.

Do not buy nor use a patent medicine, especially if it is advertised to cure certainly, or is advertised with pictures that are obscene or that offend modesty. Most testimonials as to cures by "patent" medicines are false, or are got by fraud. Many are bought from dishonest people. Others, honestly given, are from people who have not really been ill, but have worked a "faith cure" on themselves.

Tonics and bitters are perhaps the most popular of the liquid preparations, and usually contain large quantities of alcohol, to which a good deal of their popularity is undoubtedly due. The analysis of these compounds is attended with considerable difficulty and consumption of time. The analyses are not claimed to be complete, but these constituents have been identified in the following preparations:

	Alcohol by volume.	Approximate constituents.
Peruna	24.90	Vegetable extractives.
Ontario chemists' tonic bitters.....	15.58	Vegetable bitters.
Stringer's nervine.....	7.95	Sarsaparilla, oil of wintergreen, sulphates.
Dr. Shoop's restorative.....	10.2	Bitters, sugar, strychnine (3-100 grains to dose).
Castoria	3.5	
Ayer's sarsaparilla.....	23.30	Sarsaparilla, potass. iodide.
Burdock blood bitters.....	16.00	Bitter, sugar, lime, phosphates.
Warner's safe cure.....	11.40	Potassium nitrate, herbs.
Hood's sarsaparilla.....	.....	Sarsaparilla, potass. iodide.
Lydia Pinkham's vegetable compound	21.00	Sugar, bitter herbs.
Paine's celery compound.....	19.00	Bitter herbs, sugar, potash salts, phosphates (small quantity).
Pierce's golden medical discovery...	.....	Wild cherry extract, iron and phosphates, arsenic.
Powley's liquozone.....	.....	Sulphurous acid, sulphuric acid, iron 1/1250 phosphoric acid.
Chase's catarrh cure.....	.....	Starch, menthol, carbonates, borates.
Agnew's catarrh cure (formula on bottle confirmed).....	.....	Cocaine hydrochloride, benzoates, soda bicarb, boric acid, menthol.
Beecham's pills.....	.....	Aloes, ginger, soap.
Carter's little liver pills.....	.....	Podophyllin (1/4 gr.), aloes.
Holloway's pills.....	.....	Aloes, rhubarb, saffron, Glauber's salts, pepper.
Abbey's salts.....	.....	Tartaric acid, sod. bicarb. mag. sulph. and sugar.
Eno's fruit salts.....	.....	Sod. bicarb., tartaric acid and citric acid.
Siegel's syrup.....	.....	Aloes, capsicum, licorice, sugar.
Drink cures		
Mrs. Terry's drink cure.....	.....	Sugar 98%, salts 2%.
Antidipso .....	.....	Potass.-chlorate, sugar.

INSTRUCTION SEVENTY-THREE—Massage

How to Give Massage and Baths to Patients

The Wonderfully Soothing Influence of Massage
in Nervous Exhaustion.

A Lesson in Giving Massage.

Subject Reference
For Turkish, Russian & other Baths
see Vol. 1, p. 82-89.
For Muscular System of the Human Body, see Vol. 1, pages 19 to 24.

MASSAGE AND BATH SYSTEMS.

MASSAGE.

Massage is valuable because it stimulates the nerves, increases the tone or welfare of the circulatory system (particularly influencing the nerves that govern the size of the blood-vessels), exercises and develops the muscles, and does not put any tax on the central nervous system, as exercise does. Besides these advantages, the soothing influence of the rubbing itself is of great benefit to persons who are nervously exhausted. The special uses of massage in the treatment of disease are not within the scope of this work, but we may here mention the conditions in which it is safe and helpful: contracted scars, writer's cramp, wry neck due to rheumatism, St. Vitus' dance, locomotor ataxia, neurasthenia, hysteria, obesity, drug habits, convalescence after exhausting fevers, bruises, after healing of fractures and sprains. It is also excellent for the scalp when the hair is thin or falling out.

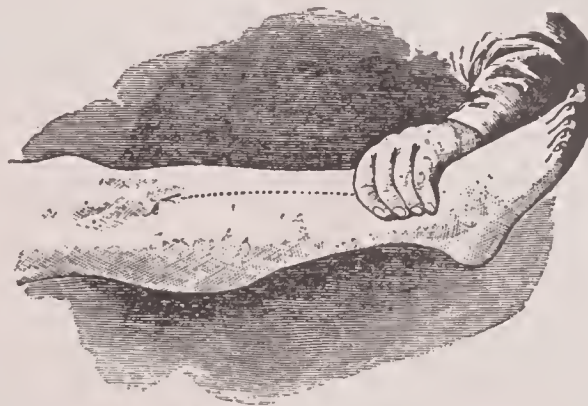


Fig. 321. Massage of the leg. Stroking.

General Rules.—The person administering massage (the so-called masseur if a man, or masseuse if a woman), should have soft, clean, warm, and dry hands. A general rub should be given about bed-time, and should last from one-half to one hour. Massage should not be administered for an hour after a meal, nor in case

of fever, enlarged veins, tumors, acutely inflamed skin, burns, fever, cancer, and when, as rarely happens, it irritates rather than soothes. In pregnancy it is good, but abdominal massage must be avoided then. Massage in the day-time should be followed by an hour's rest.

Fig. 322.
Massage of the knee. Rubbing
and stroking.



Several special methods of movements have been devised, but, as a rule, the claims for them are not based on facts. The simple, common-sense method of rubbing outlined in the following paragraphs contains the most important movements taught by several "special schools."



Fig. 323.
Massage. Kneading the muscles
of the arm.

The movements of massage are:

1. **Effleurage**, gentle surface stroking of the part, which quietly starts the circulation before the more vigorous rubbing begins. It should be towards the heart.
2. **Friction**, consists in a firmer and deeper pressure-rub than the preceding.
3. **Petrissage** is a very deep kneading of the part, and completes what has been begun by 1 and 2. It is essential in petrissage to hold firmly to the skin, and to make this rub the subcutaneous tissues, while these in turn press the muscles, and so on until the soft parts are so manipulated, squeezed, and pressed against the bones of the patient that a pushing-on of all the blood and lymph takes place. Some of the semisolids also become disintegrated, and are swept on in the hurried circulation to be utilized by the tissue, or to be excreted, in-

stead of remaining in the body as sources of irritation by giving rise to poisonous substances called leukomains.

4. **Tapotement**, or **Percussion**, is **tapping** in a rapid, vibratory manner with the balls of the fingers of one or both hands held gently closed, similar to the position of holding a pen, the motion being from the wrist. This movement is not so essential as the others, but is sometimes used in conclusion as a stimulator of the circulation when this is very sluggish.

Fig. 324.
Clapping and striking the
lower part of the back.



These manipulations are followed with effleurage, shading off into very gentle strokings. These are soothing to the part, as well as to the whole nervous system, and they also equalize the blood circulating in the superficial tissues, from which it has been pressed out.

Method.—The subject thoroughly relaxes all his muscles, as he lies on a couch or narrow bed, on his right side. The manipulations are given to the left foot, toes, ankle, thigh, hip and buttock, in turn. All the movements described are used over each part (i. e., first stroking all the parts in succession, then rubbing all in succession, then kneading, then tapping), varying the time and duration of each manipulation in proportion to the size, rigidity and amount of muscle or other soft tissues present. The patient then turns on his left side, and the right foot, leg, thigh and buttock are gone over in the same way. Next the left fingers, forearm, arm and shoulder are given, first, the long, sweeping effleurage, followed again by the other movements described. Four or five minutes will suffice for each extremity or limb. The right arm is next taken up. The patient then lies on his abdomen, with a pillow placed under him for better resistance. The long series of strokings down the groove on each side of the vertebral spine are made alternately with the fingers of each hand spread on either side of the spinous processes. Then a series of circular frictions are made down each side of the spinal column with one hand; next a spreading movement from the spines outward is performed with the balls of both thumbs; next a firmer kneading with both hands closed, followed by kneading with the palms of both hands alternately run down either side of the spinal column; finally stroking finishes. The patient then lies on the broad of his back, and the pillow is removed.

The movements for massage of the chest consist principally of two: 1, a firm

stroking from in front, following the ribs from the breastbone outward and downward; and, 2, of firmer, deep kneading, the balls of the thumbs here playing an important part; the massage must be done carefully, causing no pain.

Massage of the **abdomen** is very important and difficult. The patient lies on his back with his knees drawn up to relax the muscles of the front of the abdomen. The surface stroking is simple, but the kneading is apt to cause tickling unless it is done with skill. It should be begun on the small intestine (in the middle region of the abdomen, about and below the navel), working with both hands and using a "spanning" movement. Then proceed to the right groin and work up to the ribs, then across to the left side, curving downward, then down to the left groin. (In brief, follow the course of the large intestine.) In this, one hand follows the other in a rotary motion. Stroking follows next, and in case of constipation, **tapotement** is very useful.

The head, face and neck are not rubbed except in special cases. If these parts are to be massaged, the stroking and kneading are made in the direction of the flow of blood in the veins—from the midline towards each side and from above downward.

In all the movements the pressure or direction of the stroke, etc., should be from the periphery toward the heart.

BATHS.

The temperature of baths varies according to requirements. The water must be tested with a bath-thermometer. A hot bath varies from 98° to 110° F.; a warm bath varies from 85° to 98° F.; a tepid bath varies from 70° to 85° F.

A bath must never be given within two hours after eating, because the digestive organs are congested, owing to their increased activity in the process of digestion.

Hot-baths.—Hot baths and vapor-baths are intended to produce perspiration. If a tub-bath is ordered, the tub may partly be filled with warm water, and then the temperature gradually increased, after the patient is in, by adding very hot water. At the end of fifteen minutes the patient is put into bed, and is wrapped in blankets, which are tucked in very closely about the neck and body, to prevent the circulation of air. Cold cloths may be applied to the head, and hot water or lemonade given to drink. When there is a large amount of water in the body, perspiration is much more profuse, and impurities are thrown off in greater amount. After the object is accomplished, the blankets are removed and the patient may be sponged with warm water or with alcohol and water.

Hot Foot-baths.—The patient may sit on the edge of the bed and put his feet in a pail or tub, or if he may not sit up, the foot-bath may be given as he lies in bed. The bed-clothes at the foot of the bed are loosened, a newspaper or a rubber cloth is spread across to keep the bed dry, the bather's knees are drawn up, the feet are placed in the tub, and the clothing is drawn about the limbs to prevent chilling. The temperature of the water is kept up by adding hot water. When taken out, the feet are wiped dry, and kept comfortably warm either by wrapping them in a hot blanket or by applying hot water bottles.

Hot-vapor Bath.—This bath should be given only under the direction of a physician, who will give orders as to the length of time the patient is to remain in the bath. A rubber cloth or an oil-cloth and blanket are put on the bed (in the same way that a clean under sheet is put on in changing the bed); the bed

clothing is removed, and the patient is next wrapped snugly in the blanket, the upper clothing being supported by means of a cradle. The clothing should be well tucked in about the neck and at the sides of the bed under the mattress, to prevent the circulation of air; another oil-cloth put over all will make the covering much more air-tight. Under the clothing, at the foot of the bed, is inserted the spout of a kettle of boiling water, which can stand over a gas- or an oil-stove or a spirit-lamp placed on a chair or a table. If the bed has a high foot-board, the steam may be supplied from one side of the foot of the bed. Great care must be taken against fire. A thermometer is to be placed in the bed, and the steam continued until the thermometer registers 120° F. or above; the steam then to be stopped and the patient treated as after the hot bath. Enough water should be

Fig. 325.

A convenient way to take a vapor bath. Boiling water is placed in the small tub or other container and a blanket is thrown over it and the patient.



put in the kettle to avoid any need of adding more during the bath. It should be brought to a boil before the bath is begun. Careful watch must be kept over the patient's pulse, taken at the temples.

In the lack of an oil-stove or a spirit-lamp, very hot bricks, smoothing-irons, or plates, may be wrapped in wet flannel or cloths, to make steam. They must be placed about the patient on plates or in dishes to prevent wetting the bed. Care must also be taken not to burn the patient.

Another way to give a vapor-bath when the patient is able to sit up is to have him be seated on a cane-bottom chair, his clothing being removed, while he is surrounded with blankets or comfortables, fastened from the neck down. A kettle of boiling water over a spirit-lamp or an oil-stove, or what is safer, a pan or pail of boiling water, is placed under the chair. The feet may at the same time also be put into a pail of hot water to increase the effect. The blood-vessels of the skin are dilated, and remain so while the heat or vapor is continued, increasing the activity of the skin, the pores of the skin being opened, and perspiration produced. The blankets or coverings must be fastened closely around the neck and about the chair to prevent the steam escaping. Cold should be applied to the head, and water given to drink, for the reason given in describing the hot baths; the after-treatment is the same as for a hot bath.

Hot-air Baths are given the same as hot-vapor baths, with the omission of water to generate steam. The air is heated by means of an alcohol-lamp or an oil-lamp, and conveyed beneath the clothes by means of an elbow of stove-pipe.

Acid Steam-baths are valuable in rheumatism. They are given by prepar-

ing the patient in the usual manner, and placing about her very hot bricks wrapped in flannel which has been dipped in vinegar. The bath is continued fifteen minutes; the body is then wiped over with a towel wrung out of cold water, and then thoroughly dried.

The **sheet-bath**, or **drip-sheet**, is frequently used in nervous diseases, given in the following way: The patient, undressed, stands in a tub containing enough warm water to cover the feet to the ankles, to avoid chilling. A sheet wrung out of tepid water is thrown over the patient from behind, to cover the head and entire body. The patient is then gently rubbed (over the sheet) with both hands, the friction bringing the blood into the skin. As the sheet becomes warm



Fig. 326.

Kneipp water cure. The skin is never wiped dry in the Kneipp treatment, but is left wet. The bath should be short in duration. The part bathed may be rubbed, kneaded or tapped during the bath, and should be well covered afterward.

it may be cooled by pouring more water on it from a cup or bowl. The physician always gives directions as to the length of time the patient should be in the sheet. Some physicians have their patient, after being dried, put to bed for a time; others leave orders for the patient to dress and go out for a short walk or sit by an open window.

Affusion with cold water is given by wrapping the patient in a sheet, placing him in the bath-tub, and pouring pailfuls of water over his body. The first pailful should be tepid, and be poured rather slowly, to avoid shock. Exhaustion also must be avoided. After the douche the patient should be put to bed and wrapped in blankets. Another way, often employed in nervous diseases, is to have the patient stand in the bath-tub while the water is poured on the spine or the part to be treated by means of a piece of hose-pipe attached to the faucet, or by use of a garden watering-can without the "rose" or sprinkler.

The **cold pack** is used to reduce the temperature in many acute diseases. A rubber, an oil-cloth, or a newspaper, is first put on the bed, and over it one or two blankets; then a sheet which has been dipped in cold water and wrung out is placed on the blankets. The patient is undressed and laid upon the wet sheet.

Every part of the surface of the body is covered by tucking folds of the sheet down between the arms, body, and legs. The sheet is tucked well in at the neck and feet, and the blankets are then laid over and tucked under the patient on both sides. The feet are lifted up, and the ends of the sheet and blankets tucked under them. A wet towel is applied to the head. The patient should be kept in the pack ten or fifteen minutes. It lowers the temperature, and often relieves nervousness and induces sound sleep.

The **hot pack** is given in the same way as the cold pack, except that the blanket or sheet is wrung out of boiling water by putting it in a sheet and pouring boiling water over it; two persons then each take an end of the sheet and wring in opposite directions. More coverings have to be put over the patient than in the cold pack. Should there be nothing at hand with which to keep the mattress dry, a table or the floor beside the bed may be arranged with blanket and sheets. Towels, table-cloths, and old linen, may be used instead of sheets if these latter are scarce. After the pack has been applied long enough, the sheets and blankets are removed, the patient is wiped dry with soft towels, dry clothing is put on, heat is applied if necessary, and the pulse and temperature are to be taken.

Partial packs are hot or cold compresses applied to a part of the body, which are then covered with flannel or cotton to keep the patient's clothing dry.

Faith in medicine is one of those strong emotions of the mind which, like hope and despondency, exert much influence upon the progress of a case of illness, whether it is placed in the medical attendant or in the system of treatment. The history of popular delusions connected with the treatment of diseases is rich in illustration of how far simple faith in some method of treatment which has acquired reputation will add to the apparent curative powers of that method, in consequence of results which are due to that tendency to cure, which has no more powerful assistant than the hopeful and trusting, even if mistaken, mind. It sometimes becomes a nice question in medical ethics how far medical men are justified in using this agent in the treatment of their patients. With the intelligent and unprejudiced, a true faith in curative means, grounded in clear understanding of the nature of their case and of the requisite treatment, is always to be preferred to a blind and unreasoning trust, however implicitly given; but amid the ignorant, if they will employ a fomentation more assiduously because it has a few chamomile flowers in it, or such like, and if it will insure their greater faith in the treatment generally, it is quite right to use those things. Many persons err in placing too great reliance—faith—in mere medicines and drugging alone, to the neglect of the equally important general aids in the treatment of disease, so often alluded to in this work. Such persons are not content, and do not think themselves properly—"actively"—treated if they are not constantly swallowing physic. The error must

in a great degree be ascribed to the foolish, absurd and, it may be said, degrading system, which has so long prevailed, of making the remuneration for the time and skill of a medical attendant depend upon the price of his drugs. The medical profession would gladly change the system. Many are endeavoring to do so, but still a large proportion of the payments of medical accounts are based upon the medicines, and disputes for attendance charges are constantly being made. The man who will insist upon basing his medical attendant's just remuneration upon draughts and mixtures, must probably, in many cases, be content to swallow sufficient to remunerate. This system, in addition to other evils, has engendered a faith in mere drugging as necessary for the cure of disease, to the exclusion—and this is the main evil—of other essential aids. The public are in many cases becoming alive to the absurdity of the old system, and medical men might by an effort overturn it entirely, and, by so doing, place both themselves and patients in a better and juster position.

Homeopathy is the system of treating disease founded by Hahnemann, upon the supposed principle that diseases presenting certain sets of symptoms are cured by medicinal agents which, in large doses, have the power of exciting similar symptoms in the body of a healthy person to whom they are administered. On this principle, practical homeopathy enjoins the administration of these medicinal agents in very minute doses. Some drugs cause opposite effects in small doses to what they do in large doses. Hence, reasoned Hahnemann, if large doses of a drug produce the same symptoms as a certain disease, then **small doses** will cure the disease.

The Weir Mitchell Treatment, originated by Dr. Weir Mitchell, of Philadelphia, consists of isolating the patient from her friends, giving her large quantities of food, with electricity and rubbing. The patient is strictly confined to bed and made to rest absolutely, not being allowed even to feed herself nor to turn over in bed. She is vigorously rubbed all over twice a day—massage being much better than simple rubbing. (See Massage.) After a few days' or weeks' absolute rest the patient is allowed to begin the use of her muscles gradually and to increase the daily exercise until she takes long walks and other quite strenuous exercise. This treatment is well adapted for hysteria and for nervous prostration ("nerves"). It is best given in a "home," "establishment" or suitable hospital, and high prices are charged. It may be carried out in private, however, with the aid of a good, firm-willed nurse under the guidance of a regular doctor. Probably the chief benefit is derived from the removal of the patient from the injudicious influence and pernicious overcare of well-meaning but ill-advised friends. How often have we seen "delicate," sickly, pernickety "young ladies," who were the hourly care and anxiety of their fond and unwise mothers, become healthy, sensible women when they were married and had to do their own housework, take care of their babies and be no longer petted and coddled and doted. There is no greater tyrant than the young lady who fancies she is delicate, has a variety of ailments, is constantly waited on, and being "saved" by her much

less able-bodied mother. Sometimes the tables are turned, however, and the daughter is the martyr. In such cases (and they are numerous, but of course do not include all those in which the nervous system is at fault) removal from home and its unfavorable, enervating influences, together with a firm and strict discipline, will promptly give improvement or cure. Outdoor life and real occupation will work wonders. Every woman to be healthy and happy must have these. While the "rest cure" is excellent for many cases, yet in some it is unfortunately true that the patient never gets over it—must keep on resting all her life.

The Lander System was invented by Dr. G. Lander, of Stockholm, and consists in the use of a series of machines, of his invention, by which the various muscles of the body are brought into play. It is useful in a few cases, but for most people a gymnasium or ten minutes night and morning with two-pound dumbbells is all that is needed.

The Ling System, or Swedish movement cure, was named after Peter H. Ling, a poet and physiologist. In 1813 he set up an institution at Stockholm to practice and teach his system of gymnastics for either the sick or the healthy. "Passive" movements (made for the patient by an assistant who moves the patient's arms, legs and head), gradually replaced by "active" movements (made by the patient himself), are used. In this way the stiff joints and muscles are often suppld up and, most important, the heart is strengthened. It is especially good for old people and for busy brain-workers and for indolent women. Golf, lawn-bowling, billiards, etc., should take the place of the "cure" as soon as possible.

INSTRUCTION SEVENTY-FOUR—Diet

One Man's Meat Is Another Man's Poison

Do You Know What Is Indigestible and What Is Not?

Subject Reference

For Organs of Digestion, see Vol. 1, pages 45-55.

For the Uses and Functions of the Digestive Organs, see Vol. 1, pages 107-147.

For Special Diets for Various Diseases, see Vol. 1, pages 318-403.

NOTE: If You Select and Balance Your Food According to the Natural Needs of the Body There Will Be No Clinkers, No Accumulation of Waste Matter in the Blood, There Will Be Nothing to Make Excess Fat, No Poisons to Make You Thin and Weak, No Lime Deposits to Pile Upon the Joints to Cause Rheumatism and Gout.

Nutritive Principles.

First: Sugar and Starches.

Second: Fats and Oils.

Third: The Flesh of Bird, Beast and Fish.

Fourth: Certain Salts and Water.

Physiology of Digestion. The data upon which life is maintained are the foodstuffs proper, and certain other substances which, though essential to nutrition, are not usually classed under this heading, but may be termed accessory or secondary foods. We may arrange the nutritive principles as follows: 1. Sugars and starches (carbohydrates). 2. Fats and oils (hydrocarbons). 3. The flesh of bird, beast, fish (proteids or albumens). 4. Certain salts. Water.

In this list the technical names of the first three groups are appended. The third group includes the albuminoids, which, in the form of **connective tissue** (fibrous material) constitute a large proportion of flesh or muscle. It is the connective tissue or tissues—present in flesh and in bone—which yield **gelatine**.

The first three groups occupy a position which is different from that of the last two (the salines, or salts, and water); the former are of very complex chemical structure, and within the organism are broken up, to be to some extent again built up within the tissues into other complex bodies; the latter—comparatively simple in their chemical structure—may either wholly escape such changes of decomposition (or breaking up) or undergo them only to a slight degree. The best example of the salt group is chloride of sodium—common table salt—a substance most widely distributed. It is to other members of this class that fruits and vegetables owe much of their value. Of course, fruits and vegetables are valuable for the carbohydrates, hydrocarbons and proteids which they contain, as well as for their salts. In a sense, water and the salines “condition” (or make possible) the complicated changes of breaking down and building up to which the term “**nutritive**” is generally restricted. The restriction of this term to the first three groups is not correct; for, though the function of a drink of



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UNDERNOURISHED BOYS

All children under weight should have a thorough physical examination in order to detect and correct errors in habits and diet.

water is wholly different from the purpose of a slice of bread or of meat, the one is as necessary to the vital processes as is the other.

The above classes of bodies furnish us with the **means of maintaining life**. To them we must add the condition of a certain **temperature**; for this also is essential, human life being limited to the narrow range of a few degrees on the thermometer scale. We shall not place **warmth** on the list of nutritive principles, though it is quite true that we may **starve**¹ from cold as well as from hunger. But what about stimulants? We have made no mention of **alcohol**, nor does it come under any one of the headings in the foregoing list. Is it a food? Is it a drug? We should prefer to rank it **scientifically** as the latter, but **practically** it will not be possible to ignore its claims.

Problems of Diet.

The problem of **diet** puts the following questions: (1) What are the absolute **quantities of food** necessary for health? (2) What are the **forms best adapted** for this purpose, (a) to insure the **taking** of food (palatability); (b) to insure the highest **assimilative values** (digestibility)? (3) What are the **times** at which food should be administered (dietetic opportunity)? Question 2, in both its parts, belongs to the domain of cookery.

The food-requirements are not, even in health, fixed quantities; they vary according to the personality, age, occupation, climate, etc., and as often as these vary, so will the answers to the diet problem be varied. Each case must be dealt with on its own merits; but, as a rule, each individual receives from his bodily sensations intimations sufficiently clear to enable him to maintain his body in health, and thus the dweller in town or country, the occupant of the office or of the saddle, is able to solve this question for the most part satisfactorily. When **common sense** and **self-restraint** regulate the kinds and quantities of food according to the measure of the **appetite**, all is well, and it is not necessary to call in the doctor.

The requirements in **disease**, however, vary. Here life proceeds on a different plane, a new order of things having arisen. In such cases **diet** is always primary, however important may be the adjuvant treatment by **medicine**—using the word in its widest sense. Here, as in health, we have the same digestive organs to consider. They may be enfeebled or positively diseased; but as long as there is any life

¹The original meaning of **starve** is to die or perish. "I'm starvin' wid th' could!"

the assimilative processes must persist. We will proceed, therefore, to consider the **digestive process**.

The act of digestion is a complicated process, taking place in several stages. It begins with **ingestion**, the taking of food into the mouth. Within this cavity the solid portions of the food are broken up, comminuted and intimately intermingled with the proper secretion of the mouth, the **saliva**. The whole process is termed **mastication**, but a special term, **insalivation**, is applied to the intermingling of the saliva with the food. Mastication, however, is the larger term, for it involves insalivation. The teeth as cutting and grinding instruments, the hard palate and tongue as crushers of the softer parts of the food, the tongue as a stirrer and holder, the salivary glands to furnish the secretion, the lips and cheeks to retain the food in the mouth—these are the parts concerned. For certain solid foods the mouth serves only to disintegrate, to break up, and in this way to prepare for the next operation; but in the case of certain others, belonging to the group of the starches and sugars, it performs an additional process by the influence of the saliva upon the carbohydrates as a group; by it these are converted into **more soluble** or assimilable bodies. The active principle in the saliva is a ferment called **ptyalin**, and it serves the same use that an allied body, **diastase**, performs in the process of malting. The saliva by moistening the food prepares it for **deglutition**—that is, swallowing. This is a mechanical service which the saliva effects for all forms of solid food; but it is an interesting question whether the saliva, as an alkaline fluid, does not perform yet another service, and facilitate in the stomach the penetration by the acid gastric juice of the masticated food. Be this as it may, it will be abundantly evident that not only good manners, but good physiology, requires that we shall not drink with solid food in the mouth; fluid thus drunk will, it is true, moisten the food and thus facilitate swallowing, but it will not replace the saliva which should have performed this office of aiding the action of the gastric juice.

We would here insist upon the fact that the mouth does not concern itself with liquids, beyond passing them on. Such foods have no stage in the mouth; and the like is true of semi-solid substances, such as jellies, creams, custards, junkets. These may be swallowed along with a certain amount of saliva, but there can be little comminution or insalivation. The tongue and hard palate may crush these soft foods, but most of them become fluid as soon as they are warmed in either the mouth or the stomach. In certain stages of disease we may, purposely and for various reasons, jump the stage of **digestion** in the

mouth, and administer only liquid nourishment. It may be well to insist, however, that it is necessary to take such food **in small mouthfuls** so that the stomach may handle them better.

To one point we may with advantage draw attention—viz., that the process of mastication is **under our own control**, and that we are directly responsible if the digestive act fails through the incomplete performance of the functions of the mouth. In case the **teeth** are defective and not able to do the work which naturally is required of them, the greater part or all of the process of cutting and grinding the firmer foods, such as meat, should be carried out artificially beforehand, as by the use of a meat-chopper or grinder. Otherwise only the softer foods should be taken.

The next stage takes place in the stomach, for the fauces and gullet serve merely as conducting tubes between the mouth and the stomach. Within the latter organ the food remains a considerable time, and during the whole of this period it is subjected to the action of an acid secretion, the **gastric juice**. It is formed by the lining membrane, or **mucous coat**, of the stomach, and contains hydrochloric acid, mucus (or slime), and ferments, of which the chief are **pepsin** and **rennin**. This fluid gradually permeates the contents of the stomach, the intermingling being facilitated by certain movements of constriction and relaxation of the muscular walls of the organ; these movements are termed **peristalsis**. Escape of the contents onwards into the intestine is prevented by firm contraction of the orifice of exit from the stomach, so that during active gastric digestion this organ is a closed sac. The gastric juice owes its activity to the presence of two elements—namely, a ferment named **pepsin** and free **hydrochloric acid**. Again we find that one particular class of food-stuffs is specially acted upon in the stomach: this time it is the proteids, a class of **albuminous** bodies, which constitute the chief part of the **flesh** or **lean meat** of bird, beast, and fish.

Digestion within the stomach lasts a variable period, dependent, on the one hand, upon the vigor of the stomach, and on the other upon the nature of the meal. As the process goes on, the more perfectly digested portions escape from the stomach into the intestine, the constricting muscle of the exit, or pylorus, relaxing to allow them to pass; once in the bowel the **acid** of the food or chyme, as it is now termed, appears to excite the sphincter (or closing) muscle **reflexly**, or through a nervous mechanism, to renewed activity. When the alkaline secretions of the liver, pancreas and bowel have overcome the acid of the small quantity of food which escaped from

the stomach, the pylorus again relaxes, reflexly, and a fresh escape of chyme is allowed. The stomach contents are thus allowed to escape little by little into the duodenum. At first sight we are tempted to consider this selective action of the pyloric orifice as too intelligent; but it is no more so than the selective action of a certain mechanism in the air passages, named the glottis, which allows free passage, in and out, to air and moisture, but closes spasmodically if a pungent vapor attempts to pass with the air. The rate at which various kinds of food are passed on from the stomach varies; thus lean meat stays longer than starchy foods, and fat stays the least time.

Beside the power to act upon the principles of meat, the stomach secretes a ferment, **rennin**, which curdles milk, curdling being the first stage in the digestion of milk. Sugary substances also undergo certain changes in the stomach. The action upon flesh is, however, the main action.

Stomach digestion differs from digestion in the mouth—if the term be allowable for whatever goes on in the mouth—in that it is not a voluntary process. We are unable voluntarily to influence the food when once it has reached the stomach; but, on the other hand, we are well acquainted with influences which do exert a modifying effect upon gastric digestion, and by regarding these we can at will seek or avoid disturbance. These influences operate also upon intestinal digestion; we shall therefore postpone their consideration till after we have described this third stage.

The next, or third, stage of digestion takes place in the intestines. The food, modified by the gastric juice, having left the stomach, is now subjected to the action of the secretions of the liver and pancreas (two important glands, which pour their secretions into the upper part of the small intestine), and of the glands in the mucous membrane lining the bowel. The walls of the intestine secrete a certain amount of fluid, called **succus entericus**, which probably plays an important part in intestinal digestion. It is not here necessary to discuss the action of these several secretions; it suffices to say that the mingled fluids energetically continue the digestion of starchy and gummy substances and of albumen, and that further they promote by emulsification and other changes the absorption of fats. The fat is broken up by a ferment, **lipase**, into glycerine and fatty acids. These are liquids and are absorbed by the wall of the bowel as such, and then re-combined into fats. Thus the third class of food-stuffs, viz., **fats**, is here dealt with. The contents of the intestine in this stage acquire an alkaline reaction.

When **digestion**—or “coction,” as the older physiologists termed the process—has proceeded far enough, **absorption** begins; and though in health a certain amount of absorption takes place from the stomach, yet the structure of the wall of the bowel teaches us that it is the small intestine which plays the prominent part in **absorption**, that is, the taking of the digested food **out of** the interior of the alimentary tube **into** the blood vessels and lymphatics, so that it can be carried to all parts of the body. The upper and middle portions of the small intestine absorb vigorously, the lower portions to a smaller degree. The small intestine terminates in the large intestine, a tract of some length. In the large intestine the liquids are absorbed and the bowel contents become solid. Here also bacteria cause further decomposition or digestion of the food-residue, especially of cellulose or vegetable fibre. Gases are thus generated which in a measure aid in the expulsion of the **feces** or undigested remnant. The bowel-contents also become acid in the large bowel or colon.

It is well to bear in mind, however, that though normally absorption takes place chiefly in one part of the alimentary tract, yet that **every part** of the tract from the stomach, even to the termination of the large intestine, may serve this purpose, provided we bring to it food in a suitable condition for absorption. Of this knowledge ample use is made in disease. In such cases the food is pre-digested by artificial means. For example, when the stomach is too irritable to tolerate food, the patient may be fed by **nutrient enemata**, that is, by pre-digested food injected into the rectum.

In health the secretions of the alimentary tract do not favor putrefactive or fermentative changes, though the contents of the stomach and intestines are highly **putrescible**. In disease such changes are very prone to become excessive.

Intestinal digestion is outside the direct control of the will, but, like gastric digestion, it may be modified by a number of disturbing conditions which we know of. We now proceed to consider these.

It is a general rule that the relative **activity of one organ or system** demands the relative **inactivity of other organs or systems**. We know that increased activity of a part involves increased afflux or flow of blood to the part, and therefore a proportionate withdrawal or withholding from other parts. If now, during activity of one system, we make the attempt energetically to use another system, we interfere with the working of the former system. Thus, severe mental effort or great muscular exertion, during digestion, will more or less disturb the latter act, delaying or even arresting

it for the time being. The experiment by Sir Busick Harwood is decisive on this point: "He took two pointers, equally hungry, equally well fed; the one he allowed to lie quiet after his meal, the other he kept for above two hours in constant exercise. On returning home he had them both killed. In the stomach of the dog that had remained quiet and asleep all the food was found chymified, but in the stomach of the other dog the process of digestion had scarcely commenced." It must not be concluded, however, that digestion cannot proceed adequately unless the other systems are **completely** inactive. The moderate use of these latter, especially in health, does not disturb digestion. It is **effort**, not **exercise**, which is harmful; and the relation between effort and exercise is so much a matter of **habit**, that we shall not be surprised to observe amounts of work performed without effort by one whose habit is **work**, which the unaccustomed person could not accomplish without severe and sustained endeavor and perhaps serious effects on the other functions of the body. Quite different physiological conditions will be involved in these two cases, the one making no extra demand upon the economy, the other taxing its powers severely. Clearly that which would disturb the digestion in the latter case would leave it uninfluenced in the former. This is an example of the almost indefinite powers of adaptation which the organism possesses, and to again quote: "We have daily experience to prove that the husbandman may return to his daily labor and the schoolboy to his gambols, immediately after a frugal meal, without inconvenience or injury: but the same degree of exercise in the case of a person of sedentary habits or of weak stamina would probably arrest and subvert the whole process of digestion."

The rule, then, for us all—strong and weakly, healthy and sick—is the **avoidance of strain, effort, tension, during digestion**; we shall in this way best avoid one of the causes of that distress with which some of us are acquainted. The moral is not the complete **shunning** of work, but rather its **habitual performance**, for in this way effort will be felt less and less.

Violent emotions are strain of another kind which may disturb digestion, but these we are more liable to be sought out by, than to seek for ourselves. We can, however, control or counteract these and cultivate a happy frame of mind.

Exposure to **cold or chill** may result in an acute attack of dyspepsia. This, again, may be accidental; but care should be exercised to avoid it.

On the other hand, the proper functioning of the alimentary tract requires a **regular action of the bowels**. This is a matter of considerable importance, and for which we are directly responsible, since it is so easily established by habit. It should, of course, be established in infancy or very early childhood. On the other hand, the regular action of the bowel is largely dependent on good digestion.

To summarize very briefly: Digestion recognizes three stages, which succeed each other in regular sequence: 1, a **preparatory** stage in the mouth; 2, a **gastric**, and 3, an **intestinal** stage. For the proper performance of the first we are directly responsible; for the other two we are indirectly responsible, to the extent of avoiding certain well-known disturbing influences.

There remains another point of view from which to regard the digestive act—viz., **the time necessary to complete it**. Upon this depend the practical questions, What should be the number of meals? and What the interval between successive meals?

The stage in the mouth—i. e., the period of mastication—demands some thirty minutes, more or less. Society has considerably protracted this period; but then the meal has ceased to be a real necessity—it has become a pastime and a fine art. This stage, indeed, can be shortened very much provided we select and prepare our food accordingly. In childhood and infancy, where the food is milk and teeth a superfluity for feeding, the meal is taken in a surprisingly short time. In adult life we may, in cases of sickness, copy this method, and reduce the digestive act from three to two stages (in the stomach and in the bowel). The stage in the stomach will occupy a variable period, according to the nature of the food, the occupation, and the state of the stomach. Nothing exact can be said of its length, but it is probably measured by hours—at the least, two or three. The third, or intestinal stage, in like manner cannot be accurately measured; but it also is probably measured by hours. The intestinal stage—continuing, as it does, the gastric digestion—supplements the latter, and hence, should the stomach empty itself relatively early, the intestinal process is likely to be relatively prolonged.

This dovetailing of the two processes increases the difficulty of apportioning to each its time limits. Taking the two stages together, we may safely count them as lasting, at the least, four hours and a half to five hours.* Though these two acts supplement each other, there are reasons for believing that they are to a certain extent antag-

*Four to seven hours is the estimate of a careful observer of the duration in health.

onistic, and cannot go on simultaneously without mutual interference. To start anew the process of gastric digestion (by taking more food) before the completion of the intestinal stage of a preceding meal, is almost certain to delay both processes. This is most important; for there can be no doubt that the present tendency is **to take too many meals**, and so to make the intervals too short. Should a dyspeptic state have arisen from such or from other causes, it is the common practice to treat the enfeebled organs by smaller quantities of food at shorter intervals, on the ground that we tax the powers least in this way. The plea is plausible, but the practice is in the great majority of cases undoubtedly harmful. On this doctrine of **little and often**, it has been said "that the stomach of an invalid is like a schoolboy—always at mischief unless it is employed." The harmfulness of the teaching cannot be too clearly stated. The **truth** is that in such cases we should endeavor to **lengthen**, and not shorten, the intervals, in order to **rest** the organs and enable them to recover their vigor. This does not mean that, in **exceptional cases**, the maxim **little and often** may not hold true—e. g., in grave illnesses, in which the intestinal tract is both feeble and irritable, resenting in particular **food in bulk**. Here we must give at **frequent intervals** because we cannot give in **quantity**. But, after all, these cases are of the nature of crises, which temporarily we tide over as best we can; and even in these we endeavor to make the intervals as long as possible, having recourse, if needful, to other modes of alimentation—as by rectal injections. Wherever the method "little and often" is forced upon us, we must make the food correspondingly easy of digestion; for in this way we lessen interference with the rest and recovery of the digestive powers. Indeed, if we artificially pre-digest the food, the alimentary tract does little more than absorb and we have no real digestive act.

As to the **number of meals** and the **intervals** between them, this cannot be set down arbitrarily for one and for all. A liberal amount of common sense is required in setting forth a dietary; but we may say broadly: That three meals a day suffice, and that the intervals should not be less than four hours and a half to five hours.

A very good arrangement is—breakfast at 8 a. m., luncheon or dinner at 1 p. m. to 1.30 p. m., and the evening meal at 6.30 to 7 p. m. Whether the midday or the evening meal should be the dinner will depend much upon circumstances and the requirements of the day's routine. These hours are necessarily earlier for certain classes, but the intervals are about the same.

And what about the afternoon cup of tea? If strictly limited to this, and it does not partake of the nature of a **meal**—even of a light one—it may be allowable. There are strict rules to be observed in the brewing of the tea (which see). But if the patient be dyspeptic, reform will, as a rule, have to commence with the abolition of this **pseudo-meal**; and in the **vast majority** of cases the taking even of a small quantity of food with the tea will do harm, by taking off the edge of the appetite for dinner. **To be taken thrice daily**, the familiar formula of the prescription, should be written large in the dining-room.

KINDS OF DIET.

“To assert a thing to be wholesome without a knowledge of the condition of the person for whom it is intended, is like a sailor pronouncing the wind to be fair without knowing to what port the vessel is bound.”—Van Swieten.

Of what should the meals **consist**? And what **quantities** should we take? These are the second and first questions in the diet problem which we have already put; the third question, as to the **times** of taking food, has just been briefly touched upon. It is the object here to consider in detail the questions of **quality** and **quantity**, but we may, with advantage, set forth here some generalities.

And first, with regard to **quantity**: we may say that **in health the appetite will regulate better than the weighing-scales**; for no fixed routine of diet can meet so satisfactorily the varying needs of the body as that varying quantity, appetite, the inconstancy of which is owing to the inconstancy of the needs. The laws of supply and demand vary, not only with each organism, but they fluctuate from day to day. The appetite is the expression of the needs of the body, and the digestive powers will prove equal to the performance of the task which it imposes. It is true we are told to leave off the meal “with an appetite,” and that this maxim will be found to be a reliable guide in many ways; but it is hard to put in practice, and it is by no means certain that it is the whole truth. The fact is, we can carry on our diet at two levels—a lower and a higher—and still be within the bounds of moderation and retain our health. It is also a fact that sustained effort can be made on the lower-diet level. But there is something more than sustained effort to be considered. There is that other something which we denominate “**Go**,” and which we may describe as tension; this it is which occasions that unrest of mind or body which impels us to action, and which underlies much

enterprise. Now, the higher diet-level favors the development of "Go," of which we can make a right or a wrong use. High diet depends for its stimulant character perhaps as much on the quantity as the quality of the food. When we speak of "high feeding," we do not mean the use of spices and the thousand-and-one incentives which the cook's art invents; we refer neither to the gourmand nor the gourmet. We simply mean a reasonable satisfying of the appetite (not a "surfeit of lampreys"), as against the use of the curb-rein. The saint has mostly chosen the latter method; but the busy, energetic, practical, and enterprising worker in all departments of industry may, without being a sinner, find that life at its high level of activity is best maintained on the high level of diet. It is probably impossible to dogmatize on these points; there is truth in both directions.

In disease, on the other hand, the scales will often have to be used to control the appetite; and notably is this the case in the graver forms of illness.

What are the quantities which the scales and the measure declare to be necessary to the support of life, when the appetite no longer guides us? This will depend upon the **quality** of the food, and we shall therefore pass to this subject.

Van Swieten, in the dictum above quoted, says well what the proverb says more tersely: "One man's meat is another man's poison." As usual, this is the proverbial half-truth; for, taking mankind as a whole, one man's meat is another man's meat. It is with exceptional states, however, that we are here dealing, and for these the proverb has much force, and we must bear it constantly in mind whilst reading the following general statements. In a minority of cases they may not apply. We now propose to consider in order the more important articles of diet, and we shall do this on the following plan—viz., we shall begin with those articles of diet which are **most easily borne**, and thence we shall proceed up the scale till we reach the **full dietary** of the healthy adult.

Milk. This is a **complete food**, which suffices the infant in the first months of life, and which all through life may be taken, as a rule, with advantage, and to which in crises we may revert as the sole article of diet. "**If you are in doubt, give milk,**" is a safe doctrine.

Milk is a compound food. If it stand, globules of **fat** rise and form the layer of **cream**, which we can skim off. If it go sour, or we add rennet under suitable conditions, we separate a substance known as **curd** (or **casein**), which belongs to the class of **albuminous** com-

pounds. At the same time that the curd separates out by the action of rennet, the **whey** does so also. This whey is a thin liquid with a sweetish taste, the sweetness being due to the presence of a **sugar**, called "sugar of milk." It is this saccharine substance which ferments in the formation of Koumiss or Kefeer. Whey, further, contains certain **salts**. We see, thus, each class of foods represented—fats, albuminous bodies, sugars, and lastly, salines.

This knowledge of the composition of milk enables us to modify milk, should occasion arise, by withdrawing or supplementing this or that constituent which may not be deemed suitable, or by altering in some way these constituents.

To apply this, let us suppose that the milk disagree either with the infant or the adult. We may proceed as follows: 1, We may boil the milk and remove the skin (curd) which forms. By this means we render the milk less digestible, but also less apt to form large curds, or to undergo harmful fermentation, for we kill the bacteria which unboiled milk **always** contains. Repetition of the act a second or third time may be advantageous. 2, We may dilute the milk with water or gruel, barley-water, rice mucilage, a weak solution of isinglass, or of white of egg. In this way we lessen the concentration of the milk, and the curd tends to separate in smaller flocules. Of diluents, barley-water is probably the best. 3, We may dilute and add an **alkali**—e. g., a few grains of **bicarbonate of soda** to the pint of milk—or **lime-water**, two or three tablespoonfuls to the pint. We tend thus to correct any sour tendencies of the stomach, and probably also beneficially affect the form of the curd. 4, We may combine with the alkali some simple **carminative**, such as cinnamon-water. 5, We may give some **stimulant**, brandy or rum, in quantities from a few drops, for the infant, up to teaspoon, dessert, or tablespoonful doses. 6, If the stomach, thus assisted, cannot digest the milk, we may assist by **pre-digesting** it: a process which we term "peptonizing." Benger's liquor pancreaticus, or Fairchild's zymine, or rennet, among many other preparations, may serve for this purpose. All are prepared from the stomach of the calf (rennet), or pig, or from the pancreas or "belly sweetbread."

In all these operations the element in milk which has to be altered is the curd, and hence another course open to us, should one milk disagree, is to change it for another less rich in curd. Arranged in ascending order of digestibility, we have goat's milk (least digestible), cow's milk, ass's milk, and human milk (most digestible). As far as curd-richness is concerned, the order will be reversed; for goat's

milk is richest in curd, ass's and human milk least rich. Ass's milk comes nearest in composition to human milk; it contains even less casein (curd). A milk approaching the composition of human milk is now prepared artificially on a large scale from cow's milk, and known as "humanized milk." Ass's milk is prohibitively dear.

Should the selection of another milk not help us we must then try an **incomplete** or **modified** milk—e. g., we may remove the cream or butter from the milk—**skim milk**, **butter milk**; or we may further remove the curd and drink the whey. To the whey we may return the cream which we have removed before curdling the milk, or we may withhold it, or we may dilute the cream with water or gruel, or use it on semi-solid food such as scalded bread or biscuit. To such incomplete milk we may apply any of the procedures which we have just enumerated as applicable to **whole** milk.

Should all these means fail, we should never omit to give Koumiss (also called "milk-wine" and "milk-brandy") a trial. It is a most excellent modification of milk, and is at times tolerated when nothing else is; there is present in it about two per cent of alcohol. Supposing milk is borne, but we do not wish to advance beyond it, we may, to vary the monotony, safely give it in the form of **junket**; for the curdling will of necessity take place in the stomach, and to perform this operation beforehand can do no harm. Moreover, the patient has the satisfaction of partaking of solid or semi-solid food, liquid food not counting in his eyes as nourishment.

But suppose that milk is not only tolerated, but that, whilst unwilling to advance beyond it, we wish to add to its nutrient powers. In such case we may enrich it by the addition of cream, or we may effect the same more cheaply by immersing in the milk some mutton suet enclosed in a muslin bag, and simmering the whole. This should be done tentatively as to quantity, beginning with, say, a heaped teaspoonful or less of chopped suet to the pint of milk, and advancing to larger quantities so long as the stomach is not averse and the milk appears to be digested. Such milk may be described as "super-added milk."

And the quantities? For infants and children, consult the sections dealing with them. If an adult, resting, is taking as his sole food between three and four pints of milk in the day, we may be quite content; we should ourselves favor the lower rather than the higher limit. There is as much nourishment in a pint of milk as in a good-sized chop.

Meat Broths. The next article of diet which we may always

give safely is **meat broth**. This may be prepared from beef, mutton, veal, or chicken. **Beef-tea** is the best representative of the group, and is much more largely used than any of the others. These infusions represent very different nutritive values, even when prepared from the same meat, **according to the mode of preparation**. As usually made with boiling water, however prolonged the boiling or however slowly the temperature is raised to the boiling point, **the most nourishing portions of the meat**—the albumens—are coagulated and left behind, the water taking from the meat its **salts**, certain complex bodies called **extractives** and **gelatine**, and **no more**. These principles, however, neither singly nor in combination, can support life. This has been abundantly proved for gelatine by widely-extended experiments, which, starting with the preconceived notion that the gelatine contained in soups was the only nourishing part of the soup, has yet been unable to establish the fact. The subject was most fully gone into during the early years of the French Revolution, when the question of the most economical means of efficiently feeding the army and the people was of national importance. Neither preconceived notion, nor the urgency of a drained exchequer, have been able to convert gelatine into a complete food. Yet it has a value, namely, that of protecting or replacing those albuminous bodies which would otherwise suffer decomposition within the tissues.

It is important that this should be realized; for we all start with the conviction that the nutritive value of our meat extract is established when it sets to form a jelly; nay, more—that it is proportional to the stiffness of the jelly. Let it be clearly understood that gelatine has a value as a food, but it is not in itself a **complete** food, nor does it become such when the stimulant qualities of salts and extractives are associated with it. It is in this latter respect, perhaps, that the broths are of chief value—viz., in their refreshing or **stimulant** powers; and at the risk of being paradoxical, we would say that in a sense the value of meat broths depends upon their low nutritive powers; for, being rapidly absorbed and readily dealt with in the tissues, they tax very slightly the powers of assimilation. They thus bring their stimulant action to bear at very little cost, so to speak; and in a manner **we take a cup of strong beef-tea much as we would take a dose of alcohol**; in the majority of cases we do so with much more benefit.

The combination of beef-tea with milk thus constitutes an excellent diet, which is specially adapted to meet grave states of depression. Such may always be given with perfect safety. As to quantity,

three pints of milk and a pint of strong beef-tea would constitute a sufficient dietary for an adult.

But should milk in all its forms disagree—and such cases arise both in infancy and adult life—we may, by adopting certain precautions, obtain in the liquid form from meat a much more nourishing food than any form of meat broth. 1, Beef-tea may be made in the ordinary way, and then to this fluid we may add varying quantities of raw meat which has been reduced to the finest pulp by scraping, soaking in water, pounding in a mortar and then rubbing through a fine-wire sieve. With the addition of a little salt, such an admixture is very palatable, the taste of the raw meat being effectually disguised. The beef-tea, when the meat-pulp is added to it, must not be very hot, or the albumen of the pulp will be coagulated, but it may be warm; the mixture is very suitably taken cold or iced. As to proportions, we may feel our way gradually; but it will be found that one ounce of pulp mixes well with two ounces of beef-tea. The **stimulant effects** of such **supplemented beef-tea** are first felt, and upon this follows the nutritive effect of the meat. 2, By means of a ferment—e. g., pepsin or pancreatin—and moderating the temperature, we can straightway produce a liquid which as a food has a high nutritive value. The albuminous bodies of the meat are, by such means, largely converted into forms ready for absorption. Such broth is described as **peptonized**: it is stimulant, highly nutritive, and readily assimilable. There are a few good commercial preparations of peptonized meats. 3, By means of common salt and soaking in cold water, with subsequent pressure and careful filtration, we can obtain from meat a fluid containing some of the albumens in solution. This is of the nature of a dilute meat-juice. By the addition of an acid—e. g., hydrochloric acid—we may facilitate the extraction of the meat. This fluid must not be heated.

Here will come the long list, daily increasing, of meat-juices, fluid meats, and meat extracts, etc. Some of them are valuable adjuvants; but in the case of many, if the attempt be made to rely on them alone, we shall need to give quantities which would risk poisoning the patient with extractives. In other words, these preparations are disproportionately rich in extractives and salts. Their proper place is that of **auxiliary stimulants**, and they require to be **cautiously selected**. To credit all the wonderful things said about them we must be possessed of much faith, of the kind which has been defined as that gift of power which enables us to believe that which we know

to be impossible. And to think that they are to be obtained in much better form from common meat!

Clear meat soups belong to the category of broths; bones are generally made use of as part of the stock, and such soups contain more gelatine than where meat alone is used. Gelatine, we have seen, is valuable as an ingredient, and soups of this kind may in most cases be allowed, even to very delicate stomachs. Soups thickened with meal of various kinds are less digestible, but the use of such will be considered later. Vegetables are frequently added to soups, but in the invalid state they are often inadmissible. On the other hand, a flavoring of herbs might be advantageously used much more than it is; and for this purpose vegetable essences are convenient, though we may readily use the vegetables themselves by enclosing them in a muslin bag, and boiling them thus along with the soup. We must be prepared to withhold these flavorings should there be the least intimation of difficulty of digestion.

Meat jellies and calf's-foot jellies will rank with liquid rather than with solid foods; their **solidity** is, perhaps, as much feigned as is the **fluidity** of milk. Gelatine is the constituent which causes the setting of the liquid into the jelly state. We may try these preparations, therefore, during the stage of slop diet if the patient feel any desire for them; but in general, where there is much disturbance and debility of the alimentary system, there is an aversion for all kinds of solid food, and even for their resemblances, and hence the jellies are usually put aside till commencing convalescence.

Eggs. The addition of eggs to the diet will constitute the next advance. Egg is a complete food for the embryo bird,* and it is highly nutritious to man. The contents of the shell are easily separable into the two parts: white and yolk. The former is little else than a solution of albumen; the latter, besides a modification of albumen, contains much fat. The starchy and saccharine group is scarcely represented in either. There are various salts. It is estimated that an average fowl's egg will contain about as much albumen and fat as a quarter of a pint of milk; but then the milk will contain sugar as well. It is also reckoned to be the equivalent of rather over an ounce and a half of fat meat. Computations have been made as to the number of eggs which, as sole dietary, would have to be taken

*This statement must be held to apply to the whole egg, shell and all: for during incubation the earthy salts of the shell are to a large extent dissolved and incorporated into the young bird.

to cover the needs of the organism for albumen, and it has been set down as twenty; this for a healthy man.

Eggs raw or lightly-boiled are easily digested, but hard-boiled they are indigestible.* In the latter form they tend to constipate, whilst raw they are laxative. In the raw or lightly-boiled egg the white is the more digestible part; the yolk is less so, owing to the richness in fat and the greater concentration of the aliment. In the hard-boiled state the white is the more indigestible. The yolk is, of course, more nourishing than the white.

We may make use of either part of the egg separately: this will be analogous to the use of the several forms of incomplete milk already mentioned. Demme's solution of white of egg consists of a dilute solution of the white, with a little sugar and cognac.† This fluid is of much value in the treatment of irritable states of the stomach and intestines in infants, and it may for a short time replace milk. In similar states of the body at all ages it would be useful. In like manner the yolk of egg may be broken up, with hot water and sugar and orange-flower water added, or cognac or rum. This is *lait de poule*, or chicken-milk.

The whole egg—white and yolk—or the yolk alone, is frequently administered beaten up in milk—egg-nog—with or without the addition of a stimulant—e. g., brandy. The yolk of egg, or the whole egg, beaten up, may be conveniently smuggled into the cup of tea or coffee where these are permissible.

The curious phenomenon of idiosyncrasy or individual susceptibility is very pronounced for eggs, some people being unable to take them in any form.

Thus far we have described what is usually spoken of as **slop diet**—milk, broths, eggs (raw or very lightly boiled). Perhaps we ought to exclude the latter (eggs) when cooked, however lightly. Such food, being of the lightest kind, **may** be given at frequent intervals, according to the maxim "little and often." At times it **must** be so given; but whenever, even on this diet, we can safely stretch out the intervals, and administer small meals, we should do so.

Included under the heading slop diet are a variety of **farinaceous** preparations—e. g., arrowroot, cornflour, gruel, barley-water and

*This is the current view amongst both medical men and the laity, but one accomplished physician, an authority in dietetics, recommends the hard-boiled egg to his patients. If finely divided the hard-boiled egg is quite easily digested.

†The whites of two eggs to a pint and a half of water, with the addition of a little sugar and cognac.

barley-jelly, rice-water, bread-jelly, etc. These preparations are mucilaginous and very bland, or demulcent, as it is technically called. Rice-water, barley-water, and water-arrowroot are the best of them, and if made thin can be borne in most cases; but the others do not diminish, but rather add to, the difficulty of digestion, and chiefly because of the fermentable character of the starch which is their principal constituent. They tend to produce flatulence. Soups thickened by means of flour or such-like are, therefore, less digestible than clear soups. The meal obtained from peas, lentils, etc., is highly nutritious, but very unsuitable for weak stomachs. Where the stomach is able to cope with these additions the general nutrition will be the gainer; in these cases we shall find that milk or broths will bear thickening with tapioca or sago, and probably that rice, well boiled, may be taken. From milk thus thickened we pass, by easy stages, to milk-puddings, which we can have more or less milky, to taste. The addition of eggs to such puddings increases decidedly the difficulty of digestion, and they should not be allowed, therefore, at first.

We should add that the most suitable drinks for quenching thirst during the slop-diet stage will be: water (iced or not), a thin barley-water or rice-water, or the old-fashioned toast-and-water. We may sweeten slightly and flavor with lemon-peel the first drinks, if this be fancied. Whey is sometimes liked, and it has the advantage of slight nutritive properties. Plain water—sipping hot—will in not a few cases be found very comforting and thirst-quenching; it obviates the “floods of wash,” which appease only temporarily the thirst and cause discomfort to the stomach.

Fish. The next step will be from slop diet to solid food. Fish is the lightest form of solid aliment, and we commence, therefore, with this. We may sum up briefly the principal points about fish diet: 1, The fish should be **white-fleshed**, e. g., whiting, cod, flounder, plaice, sole, haddock, brill, turbot. The whiting has earned for itself the title, “chicken of the sea” and deservedly. In the above list the turbot is probably the least digestible, because of the firmness of its fibre. The viscid gelatinous **skin** of fish is not reckoned so digestible as the flesh itself. Various opinions are held about the value of oysters: they are certainly nutritious, and they generally count as digestible. Dr. Paris considers they have been over-estimated; still, on occasion we may give them the benefit of the doubt and try them. They should **not** be cooked. For those who can eat

and digest herrings, mackerel, eels, salmon, there will be no need of these pages.

2. **Boiled** fish is the most easy of digestion. **Broiled** or grilled fish comes next. **Fried** fish is least suitable. In boiling fish, hard or salt water should be used.

3. **Salt** is an indispensable accessory to fish diet.

Fish in general, and in particular the more digestible kinds, is very **non-stimulant**. In this it contrasts with meat. For this reason we may with advantage add to the dietary a little strong and clear soup, and this should precede the fish.

We have now reached the stage of small meals at definite intervals, and we are, of course, permitted to include in the dietary all those articles and preparations of food which we have previously enumerated. Milk puddings—e. g., of rice, sago, tapioca—custard (boiled), jellies: these may serve to select from. Small quantities of stale bread, of thin dry toast, and of sponge-fingers, will probably be allowable. For drink: Water, plain, or if need be qualified with a little good spirit (preferably whisky), a sound claret, a Burgundy, or even a little dry sherry. Tea, coffee, cocoa: shall we allow these? Much will depend on previous habits and tolerance, natural or acquired; but in general **coffee** is least suitable; **tea** will come next; **cocoa** will be the best. If tea be taken, it should be weak and infused quite freshly, and for not more than two or three minutes. If cocoa be selected, we should use an infusion of the nibs as the best form: its bitterness and thinness will generally prove acceptable.*

Birds. Ascending the scale, we next proceed to meats; and first the flesh of birds. The flesh of the fowl, guinea-fowl and turkey is white, delicate, and easy of digestion, and we may select one or other with advantage. Fowl is in much demand, and may be said to be almost the *pièce de résistance* of invalid dietary. Such food is but little stimulant. The flesh of ducks and geese is much more tasty, but it is correspondingly more difficult of digestion, the fibre being harder and richer: it is not permissible. The flesh of game is more stimulating than that of white-fleshed poultry, and it possesses more flavor, at the same time it is nearly as digestible, and sometimes even more so. This quality it owes in part to the absence of fat, and in part, probably, to the appetite which it provokes. The partridge, pheasant, and, perhaps, quail are good examples of this class; some consider quail too rich for invalids. The pigeon ranks neither strictly as poultry nor as game: it may be kept in reserve

*Tea or cocoa is often permissible during the stage of purely slop diet.

to relieve monotony. The flesh from the breast or wings of birds should be chosen, as the most delicate. Boiling and roasting—in the latter case with free basting—are the best modes of cooking birds. In the case of birds, as in that of fish, the more digestible are those which contain least fat. Hare and rabbit are generally classed along with birds rather than with butcher's meat. Hare is very flavorsome, and when young is counted fairly digestible. It is a stimulating diet. On the whole, it is best reserved until it can be taken in all its glory of seasoning and accessories. From the point of view of the invalid, rabbit is perhaps more suitable, though at best it is but an indifferent sort of food.

Butchers' Meat: The last stage in our progress is reached at the shambles, and henceforward, by the help of a few precepts, we trust to be well rid of the invalid state.

The most digestible of the meats is **mutton**: its fibre is darker and less tender than that of **lamb**, but in spite of this it is generally admitted to be more digestible. Lamb is hence more for the epicure than the invalid, and it is its tenderness which makes it the *bonne bouche*, or choice bit, for it possesses less flavor than mutton; it is also less stimulant.

Beef comes decidedly after mutton in point of digestibility, being of much firmer texture. It ranks as more stimulating; and that this is a true estimate is, we think, sufficiently evidenced by the much greater stimulant powers of beef-tea than of mutton-broth.

Veal compares with beef as lamb does with mutton: it is both less strengthening and less assimilable. It, like lamb, is more gelatinous than the flesh of the older animal.

Pork is **wholly unsuitable** for the invalid, but **bacon**, curiously, is more digestible than pork, and may on occasion be allowed to the dyspeptic. Being a **cured** or preserved food, it does not spoil so easily in the stomach.

Venison is disqualified by its high flavor, though its fibre is easily digested. It compares with mutton as game does with chicken.

Salted meats are not digestible, nor are cured meats in general, though bacon, as we have said, occupies an exceptional position. We would warn against cured tongue, in particular.

Certain parts of the animal are specially selected as articles of diet; but for the invalid we need only mention two—the **sweetbread** of the calf (there are two varieties of sweetbread) and **tripe**. Sweetbread, simply dressed and cooked, is very tender and suitable for

the invalid; its want of flavor is one qualification, its friable texture another. Tripe is reckoned digestible, but for the invalid the fat should be removed. The structure of sweetbread—and, one may also say, of tripe—is quite different from that of the meats.

As to cooking, **boiling** in general gives a more insipid, but a less rich, and therefore more digestible food than **roasting**. **Baking** is not so good a method of cooking.

Vegetables and Fruits. Vegetables and fruits remain for consideration. As a class, vegetables come late into the dietary, the majority of them requiring vigorous digestive powers. For this reason the **pea** and **bean tribe** must be excluded from the invalid dietary, though the pulses, as they are termed, are highly nutritious. The difference, however, in digestibility between very young green peas and those which have reached “a certain age” is striking. Esculent roots and tubers, turnips, carrots, parsnips, Jerusalem artichokes, must also be excluded as decidedly indigestible. Of esculent vegetable-fruits, some count the marrow as digestible; but this subclass, which further includes the cucumber (cooked, of course) and the tomato, is of doubtful advisability. The green vegetables may be admitted in part; the best will be cauliflower and broccoli, Brussels sprouts, spinach: these should be plainly boiled. When cooked, sea-kale and celery will prove very wholesome and digestible; and we must not omit boiled lettuce.

Of all vegetables, one of the first to be admitted will be the **potato**, in the floury or mealy state. In no other state is it permissible. This is best brought about by **roasting the potato in its skin**: mashing does not contribute to the digestibility. In some dyspeptic states, however, potatoes must be entirely forbidden. Potatoes vary much in size, and to allow “roast potato” does not imply consent to a whole potato. When vegetables are admitted, it must be in great moderation.

An excellent **substitute** for vegetables will be plain boiled rice, eaten, with salt, along with the meat.

We shall not forget that, where vegetables and herbs are not permitted, their flavorings, as obtained by means of essences, may be allowed. Of this we have already spoken.

Condiments are mostly employed at the meat and vegetable course. They are, for the most part, not required in health; but where digestion is sluggish they sometimes supply that degree of stimulation which the plain food fails to supply, and in this way they promote digestion. This is the philosophy of condiments.

We avoid their use as much as possible in invalid cookery. Salt, of course, is not a condiment; it is always in place.

Fruits. The dessert is a superfluity which requires health to enjoy and digest. The old saying that fruit is gold in the morning, silver at noon, and lead at night, has much of truth; and even in health we hold the dessert to be, at the least, unnecessary. The invalid with weak digestion must forego fruit, with few exceptions.

Stone fruits are the least digestible as a class; but the ripe peach may sometimes be allowed, and sometimes the apricot; the skins will, of course, be avoided.

The **apple**, however ripe, is not to be thought of, but the pear may, on occasion, be considered.

The **small-seeded fruits**—the ripe strawberry and raspberry in particular—are among the most wholesome, but the seeds may be too stimulating in irritable states of the stomach or bowel.

The **orange** is permissible in most cases; but we must carefully reject the white or inner skin, and, better still, we shall only crush the fruit in the mouth, and swallow the juice, rejecting the solid and fibrous parts.

Grapes, avoiding the skins and the seeds, are suitable in nearly all cases. The orange and the grape, with these qualifications, are undoubtedly the safest.

Nuts of all kinds we need only mention to insist upon their harmfulness, except in rare cases.

By cookery, fruit otherwise unwholesome may be converted into a safe and useful food. In particular the baked apple is very acceptable.

Bread, etc. Bread may form an accompaniment of every article of diet, being itself a valuable food. We have already touched upon its use, but we may here add that for the invalid we choose white bread; that the lighter varieties are the best; that the bread must be sufficiently stale to crumble in the mouth when masticated: if it mass itself together it is unsuitable, for the juices of the alimentary tract can then penetrate it only with difficulty. Toasted in thin slices, its digestibility is improved, and this is a ready way of making stale bread palatable.

Wheaten flour in the form of rusks, of tops and bottoms, and of some of the lighter plain biscuits, is digestible. Some of the lighter and drier sponge cakes are also of value.

No other forms should be allowed. Baked and boiled **pastry** are very unwholesome. Cakes of all kinds are bad. Batter pudding

and pancakes are very unsuitable, and even macaroni is not easy of digestion.

As to the whole-meal bread, much nonsense has been written about it. No doubt it is more nutritious, if the question be of living solely on white or brown bread; but with a mixed diet we can easily supply all that the body needs, and forego that most indigestible husk, with the small quantity of albuminoid nutriment which adheres to it. With some, however, the husk seems to partake of the nature of a conscience clause.

The Different Foods for People of Various Ages

The foregoing is a sketch only, the outlines of which will require filling up for each individual. We shall now proceed to consider in detail certain states of body—vices of the system, acquired or inherited—for which special dietaries have been established by experience. Before we do this, however, let us consider if, in the natural course of events, the stages—infancy, adolescence, maturity, decay—require special dietetic treatment. These stages are essentially of health; and we have as little right to term morbid the downward path of old age, when vitality is on the wane, as we are justified in applying the same term to the growing stage of childhood, when vitality is on the increase but not yet at its full development. Still, though they are of health, yet we may with advantage give them brief attention.

During the edentulous (toothless) period of infancy the **menu** of the hand-fed infant is, or should be, charmingly simple; milk, complete or incomplete, modified or unmodified, is the sole dietary. We have said enough already on this subject, but we may add that when milk, modified in various ways, cannot be digested, the condition is distinctly morbid, and the treatment should be in the hands of the doctor.

When the teeth begin to appear, although they are yet unfit for masticating purposes, we may admit into the dietary some farinaceous food—e. g., one or other of the patent “prepared” foods or meals, biscuits, bread, jelly, etc. The quantities will be, as a rule, under advice, and we need not specify further, but refer the reader to the section on care of infants.

A little broth or beef-tea, a small quantity of milk-pudding, some lightly-boiled egg, a little gravy with potato or bread-crumbs, some scraped or pounded meat, boiled whitefish, etc.: by these advances

we shall proceed up to the age of two years; but during the whole of this period the staple article will be milk.

From two years onward, with a mouth full of eager teeth which should be taught the full value of mastication, we shall for some years longer yet rely on milk as in the first rank of suitable foods, and especially during the years of active growth. As a reminder of this, we may recall the name, "milk-teeth," for the first set. Indeed, all through life, if milk can be enjoyed and taken in quantity not less than a pint a day, it will form, so to speak, an excellent basis. Of one gentleman, to our knowledge, whose fondness for milk was explained as the result of his never having been properly weaned, this taste must certainly be reckoned among his good fortunes.

The permanent teeth begin to appear in the seventh year. These are meant for serious use on the plainer kinds of food: bread, potatoes, milk-puddings, eggs, plainly-dressed meats, bacon, fat, butter, vegetables, fruits. From such materials can be built up the tissues of our bodies; but all through the period of childhood and adolescence it is a very wise practice to continue milk in fair quantity, either alone or with porridge, cocoa, coffee, tea, or in milk-puddings. This holds still more strongly if there be any chest weakness.

In adult life milk loses its importance—i. e., we can do without it more easily; but we never do amiss with it.

In advanced life we approach another edentulous (toothless) period, which probably indicates that we should fall back on the softer foods of childhood. Whether this is so or not, it is difficult to say: the dentist "has changed all this," both in respect of the physiognomy of age and, in a sense, the habits. Perhaps the chief indication of this period of life is temperance—the *moderata diæta* or third physician of the school of Salerno. As to quality, it is probable that meat is less needed. The famous Dr. Caius in old age returned to the food of infancy.

During the early years of life the quantity of food supplied should be, if anything, in excess of the bare needs of the body. It should be what is technically called a "luxus" supply: the measure should overflow; in this way the tissues which are growing in size and energy secure their maximum of vitality.

During the later years we shall pursue an opposite path, for fear of encumbering with waste products those tissues whose vitality, both for assimilation and excretion, is impaired.

Beyond this broad statement as to quantity we need not go; for

in other respects the conditions are of health, and with simple foods, the appetite will guide correctly. But perhaps we ought to caution that in very early life, as also in very late life, the vital powers are low, and, therefore, the resistance small. Under these circumstances we ought, if in doubt, to administer food which in adult life, in a similar perplexity, we should withhold. Provided the food is readily assimilable, the "little and often" maxim may then have some scope in old age as it has in infancy: we should be temperate, it is true—we must not be Spartan, however, in our frugality.

Alcohol. We shall treat this matter from a physiological point of view only; for the moral question—interesting as it may be, and imperative as it may be—is not the question here. There may be reasons of this kind which shall command us, under circumstances, to forego the advantages of alcohol, if it be advantageous: each must settle this point for him or herself. The plain question before us is: Is alcohol advantageous physiologically?

For the moment we will put aside the question whether alcohol undergoes combustion within the tissues, and to this extent is a heat-producer and veritable food; we will regard it simply as a **stimulant**—i. e., as a substance which enables us to unlock the forces stored up in the tissues—to realize them, so to speak. Can we, from such a use of alcohol, expect to get any good? At once it will be urged, if it unlocks the forces of the tissues, the benefit which it brings will be at the expense of the economy, and it is hard to see how a drained exchequer can be replenished by means such as these, which take just as much as they give. A steam engine which has an insufficient supply of coals for the journey to be done will hardly succeed in compassing its task by having all its remaining supply of fuel cast on the fire at once. But whilst this will hold true so far as the whole journey is concerned, such an engine, whose fires had burned low, might, by an apparently rash expenditure of what remained to it of fuel, get up steam sufficient to reach a neighboring coaling-station—a feat which would be quite impossible if the fires were fed with a more parsimonious hand. This is exactly the theory of the use of stimulants—neither more nor less: of themselves, they bring nothing to the body, and therefore of themselves they cannot permanently advantage it, but by the help of food they can reasonably aid the economy. Thus, let us suppose a patient exhausted by a prolonged fever or other illness, and just commencing convalescence: food is given; but the powers are so feeble that digestion and assimilation are most imperfectly performed, and

the organism, taxed by the effort, makes doubtful progress. The timely use of stimulants here, whilst they draw upon the small store of available force, yet **excite a sufficient digestive reflex** to start and carry through a satisfactory assimilation; and it will be then found that the organism is amply repaid by the influx of nutritive material for the expenditure which the stimulant caused. In just this way **crises** of prostration can be tided over which in no other way could be recovered from. It will be noted, then, that the use of stimulants is right as a timely expenditure of force which makes possible the utilization of food. Food is in every case the true restorative, but stimulants may be necessary to its assimilation. Always, then, stimulants must be given in relation to the taking of food: this is the **veritas in vino** (truth about wine) which we must ever keep before us.

But if alcohol be to some extent burnt up within the body, after the fashion of foods in general—and there is evidence in favor of a limited utilization of it in this sense—then it is of double use. We would caution, however, against this view of the value of alcohol: it is, at best, a very poor food.

There remains another aspect which the opponents of alcohol lay stress upon: they say that the presence of alcohol in the alimentary tract impedes the digestive ferments, and therefore impedes digestion and assimilation. This is true in the test-tube and laboratory flask, when alcohol is added in quantity to the test fluids; but it is not true even here for the lower percentages of alcohol additions, as is well shown by Sir William Roberts, in his book on "Digestion and Diet."* Therefore, not even in the test-tube do these objections hold; and, as William Hunter long since contended, "the stomach is neither a mill, a fermenting-vat, nor a stew-pan" (nor, we may add, a test-tube), "but a stomach, gentlemen—a stomach."

After all, theory, no matter how plausible, must give way to experience; and to our minds this is distinctly in favor of a seasonable and reasonable use of stimulants. These should not be used in routine fashion; children should not be brought up accustomed to their use, however moderately, unless they do not thrive; and they may be given only on advice of a physician. As a very general rule, children are better without stimulants: we, of course, are not speaking of actual disease. In adult life, as a digestive aid, alcohol taken at meals may be of great service; on the other hand, it may

*"Digestion and Diet," p. 116;

be quite superfluous. In advanced life the moderate use of cordials may be very desirable; and if moderation have prevailed till then, we need not fear their abuse. We would commend the word **cordial** to the consideration of our readers.

As to the forms of alcohol which we should employ, there is in the following list a scale of strength which will meet all requirements: 1, The **ardent spirits**: Brandy, whisky, gin, rum. 2, The more **generous wines**: Port, sherry, Madeira. 3, The **lighter wines**: Burgundy, claret, hock, champagne. 4, The **malt liquors**: Ale, porter, stout.

Of the spirits, **gin** is the least likely to interfere with digestion; but so long as the quantities are kept within small limits—e. g., two, or at most three tablespoonfuls diluted with water, there is likely an acceleration of digestion, and no interference.

Sherry or **port**, in doses of one, or at most two, wine-glasses, will act as pure stimulants to digestion.

Of the lighter wines, the limit should be two small claret or hock glassfuls. Of malt liquors, a tumblerfull.

People will, of course, differ in their powers of utilizing alcohol in digestion; but the above are safe limitations, barring individual intolerances, which are sometimes very marked, and are found not infrequently for malt liquors. According to the above-quoted experiments, the retarding effects which **large** quantities of sherry, port, claret, hock, etc., exert on artificial digestion are quite out of proportion to the amount of alcohol present, and must therefore be due to other ingredients.

THE ARTICLES OF DIET.

The **nutritive principles** may be arranged in five classes—in four, if we exclude water—but the **articles of diet**, natural or prepared, which present these nutritive principles constitute a very formidable list. To arrange them on scientific lines is very difficult; for the articles of diet are rarely pure in the sense of containing only one class of nutritive principles, and opposing views may be taken as to whether we should place a given food here or there. The following list will, we trust, possess some practical value, and at the same time be not devoid of scientific method. In it, however, foods occurring naturally are not separated from foods prepared artificially: the list is a list of **the things we eat**.

INSTRUCTION SEVENTY-FIVE—Diet

The Things We Eat

THE VEGETABLE KINGDOM.

The Bread, Rice, and Potato Class.—The various forms of bread, white and brown (including biscuits and cakes), made from wheat, oats, rye, barley, maize, buckwheat; all varieties of flour preparations—e. g., pastries (pudding and tart), batters (pancakes, etc.), vermicelli, macaroni, semolina, corn-flour (from maize; oswego and maizena are other names for the same thing); porridges and gruels, and breakfast foods. Rice, sago, tapioca, arrowroot. Potatoes.

In this class we must put foods serving a similar purpose—e. g., the sweet potato, the yam, the breadfruit, bananas and plantains, the chestnut, and, on historic grounds, the acorn.

The Pulses occupy a position by themselves, and are represented by the matured seeds: Peas, beans (haricot and broad), and lentils.

Sugar in various forms (crystalline, liquid: treacle), syrups, jams, preserves, honey, manna.

Sugar is a nutritive principle, allied to starch and widely distributed among foods, in particular in vegetables and fruits; but sugar by itself stands as an article of diet, whilst a number of food-substances owe their dietetic value to the sugar with which they are prepared. Hence, for practical purposes there is a group of sugar-foods.

The Vegetable Class.—The potato is in a sense a vegetable, but in nutritive value it associates itself with the bread group and the rice group. The pulses are likewise vegetables; but in the mature state their high nutritive value and the nature of their nutritive principles set them apart, and in proximity to both the bread and animal food classes. On the other hand, in the young and green state they return to the vegetable class.

The pea group: Green peas, green haricots, broad beans (young), French beans (pod and seed). The lentil is not eaten in the unripe state.

Green vegetables—the cabbage tribe: White and red cabbage, “greens,” savoy, Brussels sprouts, cauliflower, broccoli, broccoli sprouts, spinach, turnip-tops.

Root vegetables: Carrots, parsnips, turnips, beet root, artichokes (Jerusalem); the last named are really not roots, but tubers.

Fruit vegetables: Cucumber, marrow, tomato.

In a group not classifiable under any of the above headings may

be put: Seakale, asparagus, the green artichoke; and by itself must stand the onion.

The salad group: Celery, endive, lettuce, sorrel, mustard-and-cress, watercress, radishes, dandelion, etc. In many cases this group may with advantage be cooked like other vegetables.

Edible fungi: Morelles, truffles, mushrooms. These are akin.

Mushrooms.—The fungus tribe to which mushrooms belong contains a large proportion of poisonous members. Those who gather mushrooms for food should be very certain that they know what are mushrooms, and this will be best learned from those who are practically acquainted with the matter. Unless you are perfectly sure of the edibility of a mushroom, you should test it by eating a **very little** the first time (just a taste); if it makes you ill, take an emetic; if not, eat a little more next day, and so gradually increase until you are sure it is safe.

The Fruit Class.—We may arrange the members of this class into the following groups, which are more or less natural:

Apple, pear, quince, medlar. Orange, lemon, lime, shaddock. Plum, peach, nectarine, apricot—cherry. The fig (green). Strawberry, raspberry, blackberry, dewberry, mulberry. Grapes, currants, gooseberries. Cranberry, barberry, whortleberry. The melon. The pine-apple.

Plantains and bananas are fruits, and of high nutritive value, but on account of the starch they contain they have been already spoken of in connection with the sweet potato, yam and bread-fruit. Of dried fruits we have in common use: The fig, date, prune, raisin, apple, apricot, peach. The prickly pear and pomegranate are little used in this country. The olive scarcely reckons dietetically as a fruit.

Nuts.—These form a class or sub-class which it is necessary to separate from fruits in general. The members are nutritious, but indigestible; they are rich in nitrogenized principles, and also in oily compounds. The more important are: the almond, peanut, cocoanut, hazel-nut, Brazil-nut, chestnut, and walnut. The chestnut comes in the starch-containing group. The soja, soya, or soy bean is of the pulse tribe but on account of the small amount of starch which it contains may conveniently be placed here; it is highly nutritious. Both the nutritive principles, starch and sugar, are separable, as such, from articles of diet, and themselves are used undiluted as foods; thus arrowroot and the several varieties of sugar are eaten. In like manner fatty compounds—e. g., oils—are separable in the pure state, and are taken as such. From the vegetable kingdom we thus obtain olive-oil. This sub-group is better represented by a derivative from the animal kingdom:

The Things We Eat

THE ANIMAL KINGDOM.

1. **Milk:** its several varieties and modifications. 2. **Milk-derivatives:** Butter, cream, cheese. Butter and cream are nearly pure fats; there is a small proportion of nitrogenized matter. Cheese varies enormously in its composition, the richer kinds containing nearly as much of fatty as of nitrogenized compounds; the poorer kinds—e. g., skim-milk cheese—containing much of the latter, but very little of fat. 3. **Eggs.** Although the eggs of several birds are eaten, we practically mean fowls' eggs when we speak of the group. 4. **Fish.** (a) White fish: Whiting, sole, haddock, flounder, plaice, brill, halibut, turbot, cod. (The order here given is somewhat that of digestibility. Thus we have, as most digestible, whiting and sole; as firmer, and therefore less digestible, turbot; as perhaps least digestible, cod. White fish contains little fat. The roach, perch, pike, jack and carp also contain little fat.) (b) Oily or fat-containing fish: Eel, conger-eel, sprat, herring, pilchard, lamprey, mackerel, salmon, salmon-trout. (The eel is out-and-out the most rich in fat: it contains some three to five times as much as the other members of its group—e. g., four times as much as the conger-eel. Salmon-trout is less rich and oily than salmon, therefore more digestible.) (c) Shell-fish (crustacean): Lobster, crab, crayfish, shrimp, and prawn; shell-fish (molluscan): Oyster, cockle, scallop, mussel, periwinkle, limpet.

Of crustacean shell-fish, the claw of the lobster is digestible; the claw of the crab is much more digestible than the soft part, or "pudding"; but the whole sub-group is tasty, and tasty food in general is difficult of digestion. Among molluscan shell-fish, oysters are counted easy of digestion, but their reputation is perhaps not earned; they contain but little fat. Oysters become less digestible by cooking.

In respect of the group "shell-fish" idiosyncrasy is not infrequently manifested; and the instances of alimentary upset, at times amounting to symptoms of poisoning, are not few. The diet is risky, with perhaps the one exception of oysters when in season. We must not omit to add that oysters, mussels, cockles, contain much starchy or sugar-yielding material, and that the soft part (pudding) of crabs and lobsters is rich in the same. This fact, on grounds other than those of mere digestibility, will disqualify the shell-fish group in certain states of body. Salted, smoked, or otherwise preserved fish, or parts of fish—e. g., the roe—give us much-relished dishes, but they are for the healthy.

Birds.—White-fleshed poultry: Fowl, guinea-fowl, turkey. Pigeons may come in with these, though not reckoned as poultry. Darker-fleshed poultry: Ducks, geese. Game: Pheasant, partridge, grouse, woodcock, snipe, ptarmigan. Wildfowl: Wild ducks, teal, widgeon. Ducks and geese are unquestionably much more difficult of digestion than the white-fleshed poultry, the fibre of the meat being harder and much richer.* In like manner, wild-fowl are more difficult to digest than game. It is less easy to assign the relative positions of the white-fleshed poultry and game; for whilst the latter are more tasty and stimulant, they appear in many cases to be more easily dealt with by the system. As a general rule, we begin with fowl and advance to game; but we should bear in mind that, simply dressed, these two classes come very near together, and that the more flavorsome may, for that very reason, prove more digestible.

Meats.—Mutton and beef, and the corresponding lamb and veal. Pork and its derivatives, bacon and ham. Special parts: Liver, kidneys, heart, tripe, sweetbread, brains, calf's-head, calf's-feet, tongue (fresh and cured). Venison. Hare. Rabbit. Salted meats. Cured meats. Of this class of food, mutton is the most digestible, and it constitutes an excellent staple article of diet for the invalid and the weak of digestion. Lamb is more tender, but on the whole less digestible; the less sapid character of the lamb will, however, commend it to some stomachs in certain states. Beef is decidedly less digestible than mutton, the fibre being harder; it is fuller-flavored. Veal stands to beef as lamb to mutton in point of digestibility; its tissue is more gelatinous, less sapid or tasty. The usual accessories to veal are quite unsuitable to weak stomachs.

Pork is well known as an indigestible food; this is due to its richness and to the hardness of the fibre of the meat.

Special Parts.—The Liver is characterized by the presence of a considerable quantity of sugar, and it also contains a substance closely allied to, and readily converted into, sugar. The quantity of fat which it contains is very variable. Liver is usually fried, and prepared thus, constitutes a rich dish. **Kidneys.**—The closeness of texture is the characteristic here, and is a bar to easy digestion. As a dish, kidneys rank as indigestible, partly because they are generally cooked as a savory; in this form they should not be brought within measurable distance of the dyspeptic. In themselves they

*The liver of the goose, in a state artificially brought about, is known as "foie gras." It contains a large percentage of fat, and is correspondingly rich.

are not rich, and their digestibility varies within very wide limits, according to the cooking. **Heart**.—To closeness of texture we must add hardness of fibre as distinctive: on both accounts this dish should be avoided. **Tripe**, when plainly cooked and freed from its fat, is easy of digestion. **Sweetbread** (both kinds, from the abdomen and from the throat) is a suitable food when simply dressed. **Brains** (calf's or sheep's) are both eaten and enjoyed; but this dish is rather rich in fat, independently of any mode of cooking. **Calf's-head, calf's-feet**, are both characterized by the gelatinous nature of the tissues; this may attract because of the slight mastication required; but the food-value of gelatine is not great, and both dishes possess negative rather than positive values—viz., that they do not require mastication and that they are insipid. **Tongue** in the fresh state is tender when properly cooked, but there is much fat present in the lower part of this organ.

Venison and hare are dark meats somewhat full-flavored; they correspond with game among birds. They are digestible in themselves, but their savoriness disqualifies them for weak stomachs. The rabbit resembles white-fleshed poultry closely, but is less digestible. Cured or salted meats are as a rule less easily digested than fresh meat, but the former are not so apt to "spoil" in the stomach when digestion is retarded or suspended. Brine used in curing meat may extract some nutritious value. **Bacon** usually agrees well.

DICTIONARY OF MEDICAL TERMS

Giving the Meaning in Such Language as to Bring the Subject
Within the Understanding of the People of Our Home Life.

Subject Reference

To Locate any
Organ, Disease or
Remedy, Consult
Reference Index on
Last Pages of Vol.
1 and Vol. 2. Also
consult Table of
Contents in Front
of each Volume.

NOTE.—The pronunciation is given in *parentheses*, thus (). The vowel sounds are indicated as follows: *a* like *a* in *at*; *ā* like *a* in *mate*, *ä* like *a* in *bar*; *ē* like *e* in *fever*; *ī* like *i* in *fine*, *i* like *i* in *marine*; *ō* like *o* in *wrote*, *ö* like *o* in *love*, *ö* like *o* in *move*; *ū* like *u* in *mule*.

The accent, thus ', means that the syllable to which it is affixed, is to be pronounced with particular stress of voice. In words of several syllables the chief accent is double, ", while the secondary is single, '. In several cases, the words have been respelled according to the pronunciation.

Abdomen (ab-dō'men, or ab'do-men). The belly, or that part of the body which lies between the thorax and the bottom of the pelvis.

Abduction (ab-duc'tion). Movement of a part away from the middle plane of the body.

Ablution (ab-lū'tion). Cleansing by water; a bath; washing the body externally.

Abortion (a-bor'tion). A miscarriage, or giving birth before the natural time.

Abscess (ab'scess). A cavity containing pus or matter; as a common boil or felon, or any swelling that has "come to a head."

Absorbent (ab-sor'bent). Any substance which absorbs or takes up fluids.

Accoucher (ac-coo-share'). A man who assists women in childbirth.

Acetabulum (a'-ce-tab'u-lum'). The socket that receives the head of the thigh bone.

Acid (ac'id). Sour; sharp or biting to the taste, as acetic acid or vinegar; citric acid, obtained from lemon, etc.

Acidity. The quality of being sour or acid; tartness, having a sharpness of taste.

Acrid (ak'rid). Sharp, pungent, bitter, biting to the taste.

Actual Cautery (kau'ter-y). Burning or searing with a hot iron.

Acupuncture (ak-ū-punk'tūre). Pricking the part affected with a needle.

Acute (a-cūte'). Acute diseases are of short duration, attended with violent symptoms; it is opposite to *chronic*.

Adduction (ad-duc'tion). Opposite to abduction (which see).

Adhesive (ad-hē'sive). Sticky, tenacious, apt or tending to adhere or stick.

Adhesive Plaster or **Strapping**. Sticking plaster.

Adult (a-dult'). A person grown to full size or strength; manhood or womanhood.

Affection. Disorder, disease, malady.

Affusion (af-fū'sion). The act of pouring upon or sprinkling with a liquid substance.

Albumen (al-bū'men). The white of egg. A principle of both animal and vegetable matter.

Alimentary (a'li-ment'a-ry). Having nourishing qualities, as food.

Alimentary Canal. The food-passage, comprising the mouth, throat, gullet, stomach, and small and large intestines, by which aliments (food) are conveyed through the body, and the useless parts evacuated.

Alkali (al'ka-li or le). A substance which is capable of uniting with acids and destroying their acidity, forming so-called "salts." These are not, however, to be confounded with Epsom Salts. Potash, soda, etc., are alkalis.

Alterative (al'ter-a-tive). A medicine, such as iodide of potash or hydriodic acid, which gradually changes the condition of the system, restoring healthy functions without producing sensible increase of the evacuations.

Alveolus (al've'olus). The socket in the jaw in which a tooth is lodged.

Amputation (am-pu-tā'tion). The operation of cutting off a limb or other part of the body.

Anasarca (a'na-sār'ca). A dropsy of the whole body; a general dropsy.

- Anastomose* (a-nas''to-mōse'). Communicating with each other; applied to the vessels of the body, as arteries which join by their branches.
- Anchylrosis* (ank-y-lō'sis). An immovable or fixed joint.
- Anemia* (a-nē'mi-a). Thinness of blood, in which the hemoglobin or red coloring substance is deficient.
- Aneurism* (an'ū-rism). A soft pulsating tumor, formed by the rupture of the coats of an artery.
- Angina Pectoris* (an-jī'na pec'tōris). A peculiar, painful, periodie, nervous affection of the heart.
- Angina Tonsillaris* (an-jī'na ton-sil-la'ris). Inflammation of the tonsils.
- Anodyne* (an''o-dīne'). A medicine which allays pain and procures sleep.
- Antacid* (ant''a'cid). A substance to counteract acids, as an alkali.
- Anthelmintic* (an'thel-min''tik). A worm-destroyer; worm-medicine.
- Anti-bilious* (an'ti-bil'yus). Counteractive of bilious complaints.
- Antidote* (an'ti-dōte'). A protective against or remedy for poison, or any disease.
- Anti-dysenteric* (an-ti-dys-en-ter'ik). A remedy for dysentery.
- Anti-scorbutic* (an'ti-scor'bū'tik). A remedy for scurvy.
- Anti-septic* (an-ti-sep'tik). That which kills septie germs.
- Anti-spasmodic* (an'ti-spas'mod'ik). That which relieves spasms, cramps and convulsions.
- Anti-syphilitic* (an'ti-sif''i-lit'ik). Remedy against syphilis.
- Aperient* (a-pē'ri-ent'). A gentle purgative or laxative.
- Apex* (ā'pex). The top or summit. The top of the lung.
- Aroma* (a-rō'ma). The fragrance of plants and other substances, experienced by an agreeable smell.
- Aromatic* (a'ro-mat'ik). A fragrant, spicy plant, drug or medicine.
- Arthritis* (ar-thrī'tis). Inflammation in a joint.
- Arthrodia* (ār'thrō'di-a). A movable joint.
- Ascarides* (as-car'i-dēs). Pin-worms, or thread-worms, found in the lower portion of the bowels.
- Ascites* (as-cī'tēs). Dropsy of the abdomen.
- Aseptic* (a-sep'tic). Clean; free from sepsis or dirt that gives rise to disease.
- Assimilation* (as-sim'i-lā'tion). The conversion of absorbed food-substances in the blood into tissue, or into substances like the living substance.
- Asthmatic* (ast-mat'ik). A person troubled with asthma, or difficulty of breathing.
- Astringent* (as-trin'jent). Binding; contracting; puckering; opposed to laxative.
- Atony* (at'o-ny). Debility; want of tone; defect of muscular power.
- Atrophy* (at'ro-phy). A wasting away.
- Axillary* (aks'il-la-ri). Pertaining to the armpit.
- Belching* (belch'ing). Ejecting wind from the stomach.
- Bougie* (bou'zhē). A rod-shaped instrument.
- Bronchial* (bronch'i-al). Belonging to the ramifications of the windpipe in the lungs.
- Cachexia* (ka-kek'si-a). A bad condition of the body, in which there is anemia, a yellowish pallor of the skin and a haggard expression.
- Cadaverous* (ka-dav'er-ous). Having the appearance or color of a dead human body; wan; ghastly; pale; deathlike.
- Calculi* (kal'kū-lī). Gravel or stone formed in any part of the body, as the bladder, kidneys, or gall bladder.
- Callous* (kal'lous). Hard; hardened.
- Callus* (kal'lus). Bony matter which forms about fractured bones, serving to unite them. A thickening of the epidermis where there is pressure, as on the palms at the roots of the fingers.
- Caloric* (ka-lor'ic). Heat.
- Capillary* (kap'il-la-ry). Resembling a hair. A minute tube connecting the arteries and the veins.
- Carbonic Acid Gas*. A chemical combination of two parts of oxygen with one part of carbon.
- Caries* (kā'ri-ēz'). Decay of bone or tooth.
- Carminative* (kār'min-a-tive'). A medicine which allays pain by expelling wind from the stomach and bowels.
- Cartilage* (kār'ti-lāj). Gristle; a firm substance similar to, but softer than bone.
- Cathartic* (ka-thär'tic). Purgative; a medicine that acts on the bowels.

- Catheter* (kath'e-ter). A tubular instrument introduced into the bladder through the urethra for drawing off the urine.
- Caustic* (kaws'tic). Burning; a substance which burns or corrodes living tissues when applied to them, as *lunar caustic*, or nitrate of silver.
- Cautery* (kaw'ter-y). A burning, searing or corroding any part of the body; or the instrument for this purpose.
- Cellular* (sel'lū-lar). Consisting of or containing cells.
- Cerebellum* (ser-e-bel'lum). The hinder, lower, smaller brain.
- Cerebrum* (ser'e-brum). The front, larger part of the brain.
- Chancre* (shank'er). The primary sore of syphilis; first sign of this disease.
- Choleric* (kol'er-ic). Easily irritated; irritable.
- Chronic* (kron'ic). Continuing for a long time; inveterate; the opposite of acute; running a slow course, as opposed to *acute*.
- Cicatrix* (si-kā'trix). A scar remaining after a wound.
- Circumduction* (cir'cum-duc'tion). Movement of an extremity in a circle.
- Coagulation* (ko-ag'ū-la'tion). Changing from a liquid to solid or semi-solid state.
- Coalesce* (kō'a-less"). To grow together; to unite.
- Coma* (kō'ma). Lethargy; unconsciousness; generally due to a poisonous substance in the blood.
- Comatose* (kō'ma-tose). Unconscious owing to the effect of a poison either taken into the body or generated there, as in an acute disease.
- Combustion* (kom-bus'tion). Burning.
- Congenital* (kon-jen'i-tal). Begotten or born with; existing before birth.
- Constipation* (kon'sti-pā'tion). Costiveness; obstruction or hardness of the contents of the intestines; inactivity of the bowels.
- Constriction* (kon-strik'shon). A contraction, or drawing together.
- Contagious* (kon-tā'jious). Catching, or that may be communicated by contact.
- Contusion* (kon-tū'sion). A bruise.
- Convalescent* (kon'va-les'sent). Recovering health and strength after sickness or debility.
- Cordial* (kord'yal). A medicine to increase the strength or raise the spirits.
- Corpse* (korps). The dead body of a human being.
- Corrosive* (kor-rō'sive). That which has the quality of eating away.
- Corrosive sublimate* (kor-rō-sive sub'li-māte). Bichloride of mercury; an acrid poison of great virulence, used as a powerful antiseptic.
- Cranium* (krā'ni-um). The skull.
- Crepitant* (krep'i-tant). A sharp, grating sound.
- Cutaneous* (ku-tā'ne-ous). Belonging to the skin.
- Cuticle* (ku'ti-cle). The scarf or outer skin.
- Cyanosis* (sī'an-ō'sis). Blueness of the lips, face and fingers or other parts, due to lack of oxygen in the blood (owing to poor circulation or to lack of air).
- Cystitis* (sis-tī'tis). Inflammation of the bladder.
- Decoction* (de-kok'shun). Any medicine made by boiling a substance in water to extract its virtue.
- Delirium* (de-lir'i-um'). Disorder of the intellect; wildness or wandering of the mind.
- Demulcent* (de-mul'sent). A mucilaginous medicine which soothes by covering over the tender and raw surfaces of diseased parts.
- Depletion* (de-plē'tion). Blood-letting, or any process that rapidly reduces the strength.
- Derm.* The skin.
- Detergent* (de-ter'jent). Cleansing from offending matter.
- Diagnosis* (dī-ag-nō'sis). The distinction of one disease from another.
- Diaphoresis* (dī'a-fo-rē'sis). Increased perspiration, or sweat.
- Diaphoretic* (dī'a-fo-ret'ik). Sweating; any medicine which promotes sweating.
- Diaphragm* (dī'a-fram). The muscular partition between the chest and the belly.
- Diarrhea* (dī'ar-rē'a). A fluid and morbidly frequent evacuation of the intestines.
- Diathe-sis* (dī-ath'e-sis). The disposition of body, good or bad.
- Digest* (dī-jest'). To dissolve in the stomach and intestines; to convert solid insoluble unabsorbable food into liquid soluble absorbable substances; in medicine, to make a tincture by steeping herbs in alcohol.
- Diluent* (di-lū'ent). That which thins, weakens or reduces the strength of liquid preparations.
- Diluting* (di-lū'ting). Weakening.
- Diuretic* (dī-u-ret'ic). A medicine which promotes the flow of urine.

- Dolor* (dō-lor). Pain.
- Dorsi-lumbar* (dor'si-lum'bar). Pertaining to the small of the back and just above it.
- Drastic*. Powerful; severe.
- Duodenum* (du-o-dē'num). The first part of the small intestine.
- Efflorescence* (ef'flō-res'sense). Eruption or redness on the skin, as in measles, scarlet fever, etc.
- Effluvia* (ef-flū'via). Exhalations from substances, as from flowers or decaying matter.
- Electuary* (e-lee'tū-ary). Medicine compounded with syrup or honey.
- Eliminating* (e-lim'in-ā'ting). Discharging or throwing off.
- Emaciation* (e-mā'shi-ā'tion). Leanness; wasting of the flesh.
- Emesis* (em'e-sis). A vomiting.
- Emetic* (e-met'ic). A medicine given to cause vomiting.
- Emmenagogue* (em-men'a-gog'). A medicine which promotes the menstrual discharges.
- Emollient* (ē-mol'li-ent'). A softening application which allays irritation.
- Emulsification* (ē-mul'si-fi-cā'tion). The act or process of making an emulsion.
- Emulsion* (ē-mul'sion). A white, milk-like fluid, as oil and water mixed with mucilage or sugar.
- Enema* (en'ē-ma). An injection.
- Enteric* (en-ter'ik). Pertaining to the bowel; typhoid.
- Enteritis* (en-ter-i'tis). Inflammation of the bowels.
- Entozoa* (en'tō-ōz'a). Intestinal worms; a parasite living in some part of an animal body.
- Epidemic* (ep'i-dem'ie). A prevalent disease.
- Epidermis* (ep'i-derm'is). The outer skin.
- Epigastric* (ep'i-gas'tric). Pertaining to the upper and anterior portion of the abdomen.
- Epileptic* (ep'i-lep'tic). Subject to epilepsy or the falling sickness.
- Epispastic* (ep'i-spas'tic). An application for blistering.
- Erosion* (e-rō'sion). The act or operation of eating away.
- Eructation* (e-ruc-ta'tion). Belching; expelling wind from the stomach through the throat.
- Eruption* (e'rup'tion). A breaking out in the skin.
- Escharotic* (es'ka-rot'ic). Caustic; an application which sears or destroys the flesh.
- Evacuant* (e-vae'u-ant'). A medicine to promote the secretions and excretions.
- Evacuate* (e-vae'u-ate). To empty; to discharge from the bowels.
- Exacerbation* (ek-sas'er-bā'shun). Increase of violence in a disease.
- Exanthema* (ex'an-thē'ma). An eruption; an efflorescence on the skin, or eruption accompanied with fever, such as measles.
- Excitant* (ex-ei'tant). A stimulant.
- Excoriate* (ex-cō'ri-ate). To gall; to abrade or scrape off the skin.
- Excrescence* (ex-eres'sense). An abnormal protuberance; as, a wart, or mole.
- Excreta* (ex'krē-ta) (singular: *excrement*). What is cast out from the body, as, urine and feces.
- Excretion* (ex-erē'tion). Useless matter thrown off from the system, as the perspiration, urine, etc.
- Exotic* (ex-ot'ic). Introduced from a foreign country.
- Expectorant* (ex-pec'to-rant'). A medicine which promotes the discharge of phlegm or mucus from the lungs.
- Expectoration* (ex-pee'to-rā'tion). The act of discharging phlegm by coughing and spitting. What is coughed up or spit out.
- Expiration* (ex'pi-rā'tion). The act of breathing out the air from the lungs.
- Extension* (ex-ten'shun). Straightening out. Pulling straight.
- Extravasation* (ex-trav'a-sā'tion). Effusion; pouring out of a fluid (as urine or blood) into the tissues; the act of emptying or forcing a fluid out of its proper vessels.
- Exudation* (ex-u-dā'tion). The discharge of moisture.
- Fæces* or *Fecce* (fē'seez). Excrement; the discharge from the bowels.
- Fasciæ* (fash'e-ä). Membranes covering the muscles.
- Fauces* (faw'sēs). The back part of the mouth at the entrance to the throat.
- Febrifuge* (feb'ri-fūj). A medicine that reduces temperature.
- Febrile* (feb'rile). Having the symptoms of fever; feverish.
- Fæcal concretions* (fē'kal kon-krē'tions). Hard masses of feces or intestinal contents.
- Fetid* (fē'tid). Having a rank, disagreeable odor.
- Fetus* (fē'tus). The child in the womb.

- Fibril* (fi'bril). The branch of a fiber; a very slender thread.
- Filament* (fil'a-ment). A thread or fiber.
- Filter* (fil'ter). A strainer.
- Filtration* (fil-trā'tion). Straining; the separation of a liquid from undissolved particles floating in it.
- Fistula* (fis'tū-la). A deep, narrow, crooked, unnatural passage.
- Flaccid* (flak'sid). Soft and weak; lax; limber.
- Flatulency* (flat'u-len'si). Wind in the stomach and intestines, causing uneasiness and often belchings.
- Flexible* (flex'i-ble). Easily bent; yielding to pressure.
- Fluctuation* (fluc'tū-ā'tion). The impulse felt by one hand placed over a collection of fluid (such as pus) when the part is tapped by a finger of the other hand. Used to detect presence of pus.
- Flush*. A sudden flow of blood to the cheeks or face. Washing out by using large quantities of fluid.
- Flux*. An unusual flowing or discharge from the bowels.
- Fomentation* (fō'men-ta'tion). Bathing or poulticing by means of flannels dipped in hot water or medicated liquids.
- Forceps* (for'seps). An instrument like a pair of pinchers, for extracting teeth, catching hold of membranes, etc.
- Foreign Body*. A substance not naturally present, e. g., a cinder in the eye.
- Formula* (for'mū-la). A prescription.
- Fungus* (fun'gus). A spongy excrecence, as proud flesh; a low plant, such as a mushroom.
- Galvano-cautery* (gal-van'ō-kaw'tery). An instrument used for searing or blistering by heat which is due to an electric current that heats a metal wire.
- Gangrene* (gang'grēne). Local death of a part.
- Gargle* (gär'gle). A wash for the mouth and throat.
- Gastric* (gas'tric). Belonging to the stomach.
- Gastritis* (gas-tri'tis). Inflammation of the stomach.
- Gland*. A soft, fleshy organ for the secretion or excretion of fluids, or to modify fluids that pass through them.
- Hectic* (hee'tic). A remitting fever, with chills, heat and sweat; characteristic of consumption.
- Hemiplegia* (hem'i-plē'ji-a). Paralysis of one side of the body.
- Hemoptysis* (hē-mop'ti-sis). A spitting of blood.
- Hemorrhage* (hem'o-rāje). Bleeding; a flow of blood, as from the lungs, nose, etc.
- Hemorrhoids* (hem'o-roids). The piles; varicose veins in the lower part of the rectum.
- Hepatic* (hē-pat'ic). Pertaining to the liver.
- Hereditary* (hē-red'i-ta-ry). Transmitted from a parent; inherited.
- Herpes* (her'pēz). An eruption of the skin.
- Hernia* (her'nia). A rupture; a protrusion of a part through an unnatural opening.
- Hydragogue* (hy'dra-gōg'). A purgative that causes a watery discharge from the bowels.
- Hydrogen* (hy'dro-jen'). One of the chemical elements; a gas, and the lightest substance known; one of the constituents of water.
- Hydrocephalus* (hī'drō-kef'a-lus). A disease in which there is great excess of the fluids in the interior of the brain.
- Hygiene* (hi'ji-ēne). The art of restoring or preserving health without recourse to medicine.
- Hyperemia* (hī'per-ē'mi-a). Excess of blood in the blood-vessels of a part, causing redness and warmth.
- Hypochondriac* (hy'po-kon'dri-ak'). Afflicted with debility, lowness of spirits, or melancholy; "the blues."
- Idiopathy* (id-i-op'a-thy). A diseased condition not preceded by any other disease.
- Idiosyncrasy* (id-i-o-syn'era-sy). Peculiarity of constitution or temperament.
- Ileum* (il'e-um). The lower part of the small intestine.
- Indigenous* (in-dij'e-nus'). Native.
- Indurated* (in'dū-rā-ted). Hardened.
- Infection* (in-fek'tion). Contagion; communication of disease from one to another; inoculation or implantation of a disease.
- Inflammation* (in-flam-mā'tion). Redness and swelling of any part of the body, with heat, pain and symptoms of fever.
- Inflated* (in-flā'ted). Filled or swelled with air.

- Infusion* (in-fū'sion). Medicine prepared by steeping either in cold or hot water.
- Ingestion* (in-jes'tion). Taking in.
- Injection* (in-jek'tion). A liquid passed into the bowels by means of a syringe; an enema.
- Inoculation* (in-oc'u-lā'tion). Communicating a disease to a person in health.
- Inspiration* (in'spi-rā'tion). Drawing or inhaling air into the lungs.
- Inspissation* (in'spis-sā'tion). Rendering a fluid thicker by evaporation or drying.
- Integument* (in-teg'ū-ment). The skin, or a membrane that invests an organism.
- Intermittent* (in'ter-mit'tent). Ceasing at intervals and then occurring again.
- Larynx* (lar'inx). The voice-box, just above the windpipe.
- Laxative* (lax'a-tiv). A gentle purge; medicine that loosens the bowels.
- Lethargy* (leth'ar-jy). Unusual or excessive drowsiness.
- Lesion* (lē'sion). A rupture or tearing of the flesh; a wound; an injury; a change in the tissues from normal.
- Lithiasis* (lith'ī'a-sis). The occurrence of stone or gravel, or the condition tending to formation of urinary calculi.
- Lumbago* (lum-bā'go). Muscular rheumatism in the back muscles.
- Lumbar* (lum'bar). Pertaining to the loins.
- Lymphoid* (lim'foīd). Lymphoid tissue contains multitudes of small white blood cells closely packed together.
- Maceration* (mas'ser-ā'tion). Dissolving or softening with water or other liquid.
- Malaria* (ma-lā'ri-a). A disease characterized by chills and fever.
- Manna* (man'na). The inspissated juice or gum of a species of ash, used in medicine. It is gently purgative.
- Membrane* (mem'brane). A thin, white, flexible skin or layer formed of fibers, and covering some part of the body.
- Meningitis* (men'-in-jī'tis). Inflammation of the membrane covering the brain and spinal cord.
- Menses* (men'sēs). The monthly discharge of females.
- Menstrual* (men'stru-al). Pertaining to the menses; monthly.
- Menstruum* (men'stru-um). A solvent; any liquid used to dissolve solid substances.
- Metastasis* (me-tas'ta-sis). A development of a disease in another part of the body from that in which it started, due to scattering or spreading it.
- Miasma* (mi-as'ma). The exhalation from swamps and decaying matter.
- Micro-organism* (mī'crō-or'gan-ism'). A germ; a bacterium.
- Micturition* (mic'tur-ition). Unduly frequent urination.
- Morbid* (mor'bid). Diseased; unsound.
- Mucilage* (mū'cil-age). A viscid or ropy fluid substance.
- Muco-purulent* (mū'cō-pure'ū-lent). Consisting of pus and mucus mixed.
- Mucus* (mū'cus). The sticky, tenacious fluid secreted by a mucous membrane; a slime-like substance.
- Muscles* (mus'cles). The organs of motion. They constitute the lean meat.
- Narcotic* (nar-cot'ic). Producing sleep; a medicine to produce sleep and relieve pain.
- Nausea* (naw'seä). Sickness at the stomach, accompanied with a desire to vomit.
- Necrosis* (nē-crō'sis). Death of a part only, while the rest of the body lives on.
- Nephritic* (ne-phrit'ic). Pertaining to inflammation of the kidneys.
- Normal* (nor'mal). Natural, regular.
- Nutritious* (nu-trish'us). Nourishing.
- Oblong* (ob'long). Longer than broad.
- Oedema* (or *Edema*) (ē dē'ma). Swelling due to fluid in the tissues.
- Omentum* (o-men'tum). The caul or covering of the bowels.
- Ophthalmia* (of-thal'mia). Inflammation of the eyes.
- Osteo-arthritis* (os'tē-o'-ar-thri'tis). Inflammation involving a joint and the adjacent bone.
- Oval* (ō'val). Egg-shaped.
- Oxaluria* (ox'al-ūr'ia). The occurrence of oxalate of lime in the urine.
- Oxygen* (ox'i-jen). An elementary substance, being one of the constituents of atmospheric air.
- Palpitation* (pal-pi-tā'tion). A sensible or perceptible beating of the heart; a violent beating caused by some sudden emotion, as fear, etc.
- Panacea* (pan-a-cē'a). A curc-all; a universal medicine.
- Paralysis* (pa-ral'y-sis'). Palsy; a loss of the power of motion in any part of the system.
- Paralytic* (par'a-lyt'ic). Affected with, or inclined to palsy.
- Paraplegia* (par'a-ple'ji-a). Paralysis of both sides of the body.

- Paroxysm* (par"ox-ism'). A fit of any disease; a sudden and temporary aggravation of a disease.
- Passive Movements* are movements of a person's arms or legs without effort or resistance, by another person—really a kind of massage.
- Pathology* (pa-thol'o-jy). The study of the causes, symptoms, and nature of disease.
- Pectoral* (pek'to-ral). Pertaining to the breast.
- Pelvis* (pel'vis). The lower part of the trunk. The long structure made up by the sacrum, coccyx and two big bones; also the space enclosed by these united bones.
- Pericardium* (per-i-kār'di-um). The sack inclosing the heart.
- Perineum* (pear'i-nē"um). The lower part of the body (trunk) bounded at each side by the junction of the thigh with the body.
- Perspiration* (per-spi-rā'tion). Sweat.
- Plethoric* (pleth'o-rik). Fullness or excess of blood.
- Pleura* (pleu'ra). A thin membrane which lines the inside of the chest and envelops the lungs.
- Pneumonia* (nū-mō'ni-a). Inflammation of the lungs.
- Polypus* (pol'y-pus). A tumor of mucous membrane.
- Prolapsus* (prō-lap'sus). A falling down of some part of the body.
- Prophylactic* (prō'fy-lac'tik). A medicine (or other measure) to prevent disease.
- Prophylaxis* (prō'fi-lax'is). Prevention.
- Pulmonary* (pul'mo-nā-ry). Pertaining to or affecting the lungs.
- Pulp*. A soft mass.
- Pungent* (pun'jent). Sharp, piercing, biting, stimulating.
- Purgative* (pur'ga-tive). A medicine that evacuates the bowel contents.
- Purpura* (per-pūr-a). The purples; a disease in which purple spots appear in the skin.
- Purulent* (pūrū-lent). Consisting of pus, or matter.
- Pus*. The yellowish-white matter in ulcers, wounds, sores and abscesses.
- Pustules* (pus'tules). Pimples containing pus.
- Putrescent* (pu-tres'cent). Becoming putrid or rotten.
- Pyemia* (pī-ē'mi-a). Blood-poisoning with abscess in various parts.
- Rectum* (rec'tum). The last part of the large intestine.
- Reduction* (rē-duc'tion). Setting or replacing a broken or dislocated bone.
- Reflexes* (rē-flex'es). Movements due to involuntary muscular contractions which are elicited by intentional nerve-stimulation. Thus a pin prick causes the muscles to contract and draw away the part pricked *if the nerve pathway to the spinal cord and back again to the muscles of the part pricked is healthy*.
- Refrigerant* (re-frij'er-ant). A cooling medicine or application.
- Regimen* (rej'i-men). The regulation of diet in order to preserve or restore health.
- Restorative* (re-stor'a-tive). A medicine for restoring vigor and health.
- Resuscitate* (re-sus'ci-tate). To recover from apparent death.
- Rigid* (rij'id). Stiff, unyielding.
- Rubefacient* (ru-bc-fā'shent). An application which produces redness of the skin.
- Saccharine* (sak'ka-rin). A very sweet substance which is otherwise unlike sugar.
- Saliva* (sa-lī'va.) Spit or spittle. It serves to moisten the mouth, tongue, and the food.
- Salivation* (sal-i-vā'tion). Excessive secretion of saliva.
- Sal prunelle* (sal' prū-nel') or *Sal prunella*. Nitrate of potash fused into small cakes or balls.
- Sapremia* (sap'rē"mi-a). Blood-poisoning in which the blood is non-infective.
- Septicemia* (sep'ti-sē"mī-a). Blood-poisoning, in which the germs of the disease are in the blood, and readily convey blood-poisoning to another individual by inoculation, as in a scratch.
- Scirrhus* (skir'rus). Hard, knotty.
- Scorbutic* (scor-bū'tic). Pertaining to, or partaking of the nature of, scurvy.
- Secondary* (sek'ond-ary). Consequent on, or due to, something else which is said to be primary.
- Secretion* (se-crē'tion). The act of producing from the blood substances different from the blood itself or from any of its constituents, as bile, saliva, mucus, etc.; also the substance so secreted.
- Sedative* (sed'a-tiv). A quieting, soothing medicine, which allays irritation and soothes pain.
- Sedentary* (sed'en-ta'ry). Accustomed to or requiring much sitting; inactive.

- Seminal* (sem'i-nal). Pertaining to or contained in seed or semen.
- Septic* (sep'tic). Produced by inoculation with a pus germ.
- Serous* (sē'rous). Thin, watery, like whey.
- Serum* (sē'rum). The watery parts of the blood, or of milk.
- Sinapism* (sin'a-pism). A mustard plaster.
- Sinew* (sin'ū). That which unites a muscle to a bone.
- Slough* (sluff). To separate a dead part from the sound flesh.
- Smegma* (sneg'ma). The yellowish-white curd-like substance secreted under the prepuce.
- Solution* (so-lū'tion). A liquid in which a solid substance has been dissolved.
- Solvent* (sol'vent). Having the power to dissolve substances.
- Spasm*. A violent but brief contraction of the muscles or fibers.
- Spasmodic* (spas-mod'ic). Consisting in or relating to spasms.
- Sphincter* (sfing'ter). A ring like muscle that closes an orifice so long as it remains contracted.
- Spleen*. The milt.
- Sputum* (spū'tum, plural, *sputa*). What is spit up, especially after coughing.
- Stimulant* (stim'u-lant). An exciting agent.
- Stomachic* (sto-mak'ik). A cordial for the stomach, exciting its action.
- Stool*. A discharge from the bowels.
- Strangury* (strang'ū-ri). A painful and difficult discharge of urine.
- Stricture* (stric'ture). A morbid contraction of any passage of the body.
- Styptic* (stip'tic). A medicine which coagulates the blood and stops bleeding.
- Sudorific* (sū-do-rif'ic). Sweat-producing.
- Suppurate* (sup'ū-rāte). To form purulent matter or pus, as a boil.
- Suture* (sū'ture). The peculiar joint uniting the bones of the skull.
- Symptom* (simp'ton). A sign or token; the peculiar marks of any disease.
- Syncope* (sin'ko-pe). A fainting or swooning.
- Synovia* (sin-o'vi-a). A clear fluid, like raw white of egg, in joints; it lubricates the joint.
- Synovitis* (sin'o-vī'tis). Inflammation of the sheath of a tendon.
- Syphilitic* (siph'i-lit'ic). Pertaining to the venereal disease, syphilis.
- Syringe* (sēr'inj). An instrument for injecting liquids into any of the body cavities.
- Tabes* (tā'bēs). Wasting away. *Tabes dorsalis* is locomotor ataxia. *Tabes mesenterica* is tuberculosis of the intestines.
- Tendon* (ten'don). A bunch of fibers attaching a muscle to a bone.
- Tenesmus* (te-nez'mus). A distressing pressure in the lower bowel, as if it must be discharged immediately.
- Tense* (tense). Stretched or strained; rigid.
- Tension* (ten'shun). Stretching; strain.
- Tepid* (tep'id). Moderately warm.
- Terminal* (term'i-nal). Forming the end; growing at the end of a branch or stem.
- Ternate* (ter'nāte). Three leaves formed together on a leaf-stalk.
- Tertian* (ter'shan). Occurring every other day, as in some forms of intermittent fever.
- Tincture* (tink'ture). Medicine dissolved in alcohol or proof spirits.
- Trachea* (trā'kē-a). The windpipe.
- Transude* (tran-sude'). To pass through pores or interstices.
- Tubercle* (tū'ber-kl). A swelling or tumor; the lesion of tuberculosis.
- Tumefaction* (tū-me-fac'tion). A swelling or forming of a tumor.
- Tumor* (tū'mor). A distension or enlargement of any part of the body; a swelling.
- Tunic* (tū'nic). A membrane that covers a part or organ.
- Typhoid* (ty'phoid). Weak; low; a specific fever.
- Ulcer* (ul'cer). A sore, discharging pus.
- Umbilicus* (um-bi-lī'cus). The navel.
- Ureter* (u-rē'ter). The duct or tube through which the urine passes from the kidney to the bladder.
- Urethra* (u-rē'thra). The canal by which the urine is conducted from the bladder and discharged.
- Urinary* (ū'ri-na-ry). Pertaining to urine.
- Urination* (ū'rin-a'-tion). Emptying the bladder; evacuating the bladder; voiding the urine.
- Urine* (ū'rin). A fluid secreted from the kidneys and discharged from the bladder by the urethra.
- Uterus* (ū'te-rus). The womb.

- Uvula* (ū'vu-la). The small conical body projecting from the middle of the soft palate at the back of the mouth.
- Vaccine* (vak'sēn). Pertaining to cows, or derived from them; the substance used for vaccinating.
- Vagina* (va-ji'na). The passage which connects the vulva with the womb; a sheath.
- Varioloid* (vā'ri-o-loid). A modified form of the smallpox.
- Variolous* (va-rī'o-lous). Pertaining to smallpox.
- Vermifuge* (verm'i-fuje). A worm-destroyer; a medicine that expels worms.
- Vertigo* (ver'ti-go). Dizziness; swimming of the head.
- Vesication* (ves-i-kā'tion). Raising blisters on the skin.
- Vesical* (ves'i-kal). Pertaining to the bladder (vesica).
- Vesicle* (ves'i-cle). A small cavity; a little bladder filled with a clear fluid; a pimple with its top filled with a clear fluid.
- Virus* (vī'rus). Contagious matter or poison.
- Viscera* (vis'cē-ra). The bowels or internal organs of the body.
- Viscid* (vis'cid). Sticky, tenacious, like glue.
- Viscus* (vis'kus). An internal organ.
- Vitiate* (vish'ē-ate). To injure; to impair; to spoil.
- Volatile* (vol'a-tile). Easily evaporated; substances that waste away on exposure to the atmosphere.
- Vulva* (vul'va). The external parts of the female organs of generation.

REFERENCE INDEX

FOR VOLUME TWO ONLY

*For Further Inquiry or Subjects Not Given in this Index Consult
REFERENCE INDEX in Vol. 1, Pages 657-668.*

Attention is Called to the Very Useful and Valuable Service Rendered to the Reader by the Practical Helps and Explanations in the Form of Subject References. These Will Be Found Throughout this Series of Instructions at the Head of the Various Subjects.

*For Meaning of
Medical Words,
see Dictionary of
Medical Terms,
Vol. 2, pages 681-
689.*

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- | | |
|--|--|
| <p>Abbreviations in prescriptions, 601, 589.
Abdomen, 190.
Abernethy's pill, 654.
Abnormal urine, 226.
Abscess, 16.
— alveolar, 156.
— beside rectum, 211.
— of brain, 153.
— — breast, 313.
— — spine, 187.
— — tooth, 124.
— signs of, 17.
— treatment of, 18.
Absorption, 653.
Abuse of corset, 280.
— of purgatives, 617.
Accident, preparation for, 558.
Aching feet, 620.
Acid steam baths, 643.
Acidity of stomach, 601.
Acme of fever, 574.
Acne, 462, 601, 616.
Actinomycosis, 57, 478.
Active principle, 587.
Acute fevers, nursing, 576.
Acute inflammation, treatment of, 12.
Adenomata, 63.
Administering food and medicine, 543.
Administering medicine, 597.
Advice, medical, 587.
Aerobic bacteria, 9.
Adenoids, 162.
Affections of the antrum, 157.
— bladder, 219.
— face, 153.
— gullet, 164.
— gums, 156.
— jaws, 156.
— kidneys, 219.
— lips, 154.
— mouth, 164.
— palate, 167.
— peritoneum, 191.
— salivary glands, 166.
— urethra, 219.
Affusion, 644.
Age, 512.
Age for marriage, 299.
Agents of disease, 317.
Agents, therapeutic, 588.
Agnew's catarrh cure, 635.</p> | <p>Ague, 363, 602.
Air-slaked lime, 361.
Albuminuria, 423.
Alcohol, 80, 672.
Alcoholism, 602.
Alienation, mental, 449.
Altitude and climate, 357.
Alveolar abscess, 156.
Amenorrhea, 288, 310, 603.
Ammonia, aromatic spirits of, 656.
Amputation, 77.
Anaerobic bacteria, 9.
Anemia, 470, 603.
Aneurism, 81.
Angina pectoris, 469.
Angioma, 63.
Angular curvature of spine, 183.
Animal foods, 677.
Anodyne, 603, 606, 611.
Anthrax, 52, 473.
Anthraxoid diseases, 473.
Anti-constipation, 603.
Antiseptic power of body, 10.
Antitoxin, 333.
Antrum of Highmore, 157.
Aperient pill, 604.
Aphoria, 381.
Apoplexy, 446.
Apothecaries' weights, 591.
Appearance of patient, 532.
Appendicitis, 196.
Appetite, 557.
— the guide, 657.
Apple, 669.
Applying hot bottles, 563.
— cold to head, 565.
Ardent spirits, 676.
Armpits, fetor of, 610.
Arsenic, 557.
Art in giving medicines, 598.
Arteries, injuries, 80.
Arteriosclerosis, 468.
Arthritis, 130, 477.
Articles of diet, 674.
Aromatic powder, 615, 654.
Aromatic spirits of ammonia, 604.
Asphyxia, 263.
Aspirin, 368.
Asthma, 393, 604.
—, hay, 392.
Athletes and consumption, 343.</p> |
|--|--|

- Atony of bladder, 224.
 Atrophy of testis, 236.
 Attending patient, 561.
 Auto-infection, 16.
 Autumnal fever, 321.
 Avoid indigestion, 654.

 Bacilli, 8.
 Bacillus anthracis, 473.
 —tuberculosis, 53.
 Back-knee, 147.
 Bacon, 679.
 Bacteria, 8, 16.
 Bad odor of the nose, 159.
 Baker's stomach bitters, 635.
 Baking, 668.
 Baldness, 461, 465.
 Balms, 638.
 Barber's itch, 617.
 Basham's mixture, 605.
 Baths, 642.
 Beaded ribs, 128.
 Beans, 661.
 Bed for patient, 558.
 Beddings, 509.
 Bedpan, 572.
 Bed sores, 29, 572.
 Beef, 667.
 Beef-tea, 661.
 Beestings, 490.
 Belly. See Abdomen.
 Bending of bone, 96.
 Bengal fever, 364.
 Bichloride of mercury, 360.
 Birds, 666, 678.
 Birth, 302.
 Birthmark, 82, 87.
 Birth, telling children, 362.
 Blackleg, 473.
 Black plague, 237.
 —quarter, 473.
 —smallpox, 327.
 Bladder, 219, 425.
 —inflammation, 221.
 —, weakness of, 426.
 Blebs, 458.
 Bleeders, 79.
 Bleeding, 88.
 —in typhoid, 583.
 Blindness, 454.
 Blisters, 630, 632.
 Blood, disease of, 470.
 —in urine, 226.
 Blood-letting, 12.
 Blue soldier, 478.
 Boil, 30, 420.
 Boiling, 668.
 Bone setting, 96 to 106.
 —inflammation, 164.
 —injuries, 96.
 Bonesetters, 638, 647.
 Bony tumor, 62.

 Boric acid lotion, 605.
 Bow leg, 147.
 Brandy, 605.
 Braxy mutton, 474.
 Brain abscess, 153.
 Brains as food, 679.
 Brain, compression, 120.
 —diseases, 152.
 —injuries, 118.
 —tumors, 152.
 Bread, 669.
 —poultice, 566.
 —, to judge, 488.
 Breakfast foods, 675.
 Breaking nipple strings, 175.
 Breast, 313.
 —diseases of, 173.
 —cancer, 179.
 —cysts, 177.
 —tumors, 177.
 Breath, 383.
 Brick dust in urine, 226.
 Bright's disease, 372, 423.
 Broken arm, 99, 101.
 —collarbone, 99.
 —femur, 101.
 —forearm, 101.
 —jaw, 97.
 —leg, 105.
 —knee cap, 103.
 —nose, 96.
 —patella, 103.
 —ribs, 98.
 —thigh, 101.
 Bruises of abdomen, 190.
 Buboes, 362.
 Bullae, 458.
 Bunion, 151.
 Bunt, 487.
 Burns, 33, 630.
 Butcher meat, 482, 667.
 Butter, 491.
 Butterine, 491.
 Buttermilk, 660.
 Bronchitis, 388, 390, 605.
 Broths, 660.

 Calcification, 27, 91.
 Calculi (biliary), 200.
 Calculus, 227.
 Calf's-foot jelly, 545.
 Calf's head, 679.
 Callous ulcer, 23.
 Callus, 122.
 Cancer, 63, 64.
 Cancer of penis, 232.
 —of bladder, 223.
 —breast, 179.
 —bowel, 195.
 —lip, 156.
 —rectum, 213.
 —stomach, 404.

- Cancer of tongue, 165.
 Canker (stomatitis), 164, 372.
 Carbuncle, 30.
 Carcinomata, 63.
 Care in monthly periods, 282.
 ——— puberty, 272, 278.
 — of aged, 699.
 ——— infant, 262.
 ——— sick, 531.
 Caries, 125.
 Carriers of disease, 520.
 Carron oil, 629.
 Carrying child on one arm, 140.
 — patient upstairs, 559.
 Caseation, 14, 55, 91.
 Casein, 658.
 Catarrh, 385.
 — gastric, 399, 400.
 Catarrhal appendicitis, 197.
 — inflammation, 11.
 Catching cold, to avoid, 386.
 Cathartics, 606, 608, 624.
 Cattle-plague, 472.
 Capacity, 592.
 — of household measures, 590.
 Capricious appetite, 271.
 Caul, 263.
 Cause of disease, 316, 508, 520.
 Causes of women's diseases, 266.
 Cause of consumption, 337.
 Cellulitis, 36.
 Centigrade, 594.
 Cephalalgia, 47.
 Cerebro-spinal meningitis, 335.
 Cervical rib, 140.
 Changing sheets, 570.
 Chapped hands, 630.
 — lips, 155.
 Cheese, 491.
 Chest, 173.
 — massage, 641.
 Chicken milk, 664.
 Chickenpox, 320, 329.
 — nursing, 580.
 Chicory, 492.
 Chilblains, 464, 606.
 Child-bearing, 266.
 Child crowing, 380.
 Chills, 18, 322, 556. (See Rigor.)
 Chloride of lime, 360.
 Chlorine, 579.
 Chlorodyne, 606, 620.
 Chlorosis, 271, 670.
 Choice of husband, 300.
 Choking, 169.
 Cholagogue, 608.
 Cholera, 606.
 — infantum, 657.
 Cholelithiasis, or gallstones, 200.
 Chondroma, 62.
 Chorea, 434.
 Chronic abscess, 19.
 Chronic sore throat, 628.
 — ulcer, 24.
 Cicatrix, 74.
 Circumcision, 232.
 Confidential instructions, 240, 243.
 Circulatory system, 467.
 Cleft palate, 167.
 Clergyman's sore throat, 382.
 Climate, 355.
 Clothing in puberty, 279.
 Club foot, 148.
 Clyster, 567.
 Cockroaches, 509.
 Coction, 653.
 Coffee, to judge, 492.
 Colchicin, 368.
 Cold applied to head, 565.
 — cream, 632.
 — feet, 620.
 — in head, 383.
 ——— inflammation, 12.
 Cold stage of fever, 574.
 — pack, 644.
 — sore, 155.
 Colden's liquid beef tonic, 635.
 Coley's fluid, 63.
 Colic, 419, 608.
 —, appendicular, 198.
 —, gallstone, 201.
 —, renal, 220.
 Colles' fracture, 101.
 Coma, 554.
 Communication of consumption, 338.
 Comparison tables, 593.
 Complexion, 554.
 Complications of piles, 216.
 Compound cholagogue cathartic, 608.
 Compression of brain, 120.
 Conception, 247.
 Concussion of brain, 118.
 Condiments, 668.
 Confinement, 257.
 Confluent smallpox, 327.
 Congenital hernia, 203.
 — hip dislocation, 109.
 Congestive abscess, 19.
 Constipation, 415, 603, 625.
 Consumption, 336, 516, 614.
 — and schools, 344.
 — symptoms of, 347.
 Contagion, 316.
 Contagious pleuro-pneumonia, 472.
 Contaminating milk, 495.
 Conveyance of disease, 576.
 Convulsions, 255.
 Corns, 152, 464.
 Corrosive sublimate, 360.
 Corset, 280.
 Coryza, 383.
 Costiveness, 413.
 Cough, 386, 556.
 —, whooping, 334.

- Countenance, 552.
 Counter-irritation, 15.
 Course of fever, 574.
 Cousins marrying, 300, 301.
 Cow-pox, 475.
 Cracked lips, 155.
 — nipple, 173.
 Cradle for patient, 559.
 Cramps, 456.
 Cretinism, 372.
 Crisis, 6, 551, 574.
 Critical evacuation, 6.
 Croup, 376, 380, 477.
 Croupous inflammation, 1.
 Cry of infant, 262.
 Cuban itch, 327.
 Cultivation of bacteria, 9.
 Culture, 317.
 Curative measures, 588.
 Curd, 658.
 Cure-alls, 350.
 Cure of hernia, 205.
 Cutting for stone, 229.
 Cystitis, 221.
 Cysts, 60, 68.
 — of breast, 177.

 D. T.'s, 438.
 Deafness, 162.
 Decline, 336.
 — of fever, 574.
 Defervescence, 574.
 Deformities, 139.
 Deglutition, 650.
 Delayed puberty, 283.
 Delirium, 435, 554.
 — tremens, 438, 608.
 Dementia, 445, 452.
 Deposits in urine, 226, 421.
 Derbyshire neck, 171.
 Dermoids, 68.
 Desquamation, 520.
 Destroying mosquitoes, 365.
 Diabetes mellitus, 420.
 Diarrhea, 413.
 Diastase, 650.
 Diet, 648.
 —, articles of, 674.
 —, in puberty, 279.
 Difference between male and female, 269.
 Difficulty in swallowing, 170.
 Digestion, 648.
 —, avoid in, 654.
 Digestive pill, 608.
 Dilatation of stomach, 405.
 Diphtheria, 320, 331, 477, 608.
 — and milk, 498.
 — nursing, 580.
 Diseased meat, 493.
 Disease, to avoid, 318.
 Diseases, infectious, 319.
 — medical, 316.

 Diseases, not infectious, 365.
 — of animals, 471.
 — — arteries, 80.
 — — breast, 173.
 — — circulatory system, 467.
 — — intestines, 409.
 — — joints, 129.
 — — nervous system, 417.
 — — ovary, 307.
 — — skin, 457.
 — — stomach, 399.
 — — women, 266.
 Disinfectants, 360.
 Disinfection, 324, 353, 577.
 Dislocation of collarbone, 112.
 — — elbow, 116.
 — — hip, 116.
 — — jaw, 112.
 — — knee, 116.
 — — shoulder, 113.
 Dislocations, 107, 108.
 Disorders of menstruation, 285.
 Displacements of womb, 312.
 Diuretics, 610, 628.
 Dizziness, 609.
 Doctor's visit, 560.
 Doctor, while waiting for, 584.
 Domestic medicine, 599.
 Dose for child, 590, 597.
 Douche, 565.
 Dover's powder, 623.
 Drawsheet, 559, 570.
 Drip-sheet, 646.
 Drug foods, 634.
 Dumb-bells, 524.
 Duration of pregnancy, 249.
 — — rashes, 320.
 Dysmenorrhea, 285, 310, 609.
 Dyspepsia, 399, 400, 609.

 Eclampsia, 255.
 Eczema, 86, 459.
 — of the nipple, 174.
 Eczematous ulcer, 24.
 Education of girls, 274.
 Effect of remedies, 557.
 Effervescing mixtures, 547.
 Effleurage, 640.
 Eggs, 663, 677.
 — to judge, 492.
 Embolism, 82.
 Embolus, 82.
 Embryo, 247.
 Embryonic remains, 68.
 Emmenagogue, 610.
 Empyema, 173.
 Endemic, 316.
 Endocarditis, 43.
 Enema, 567, 653.
 English measures, 592.
 Enteric fever, 320, 321.
 Enteritis, 409.

- Environment, 511.
 Epidemic, 316.
 Epilepsy, 122, 271, 431, 610.
 Epileptic seizure, 153.
 Epistaxis, 163.
 Epithelioma, 63.
 — of lips, 156.
 Epsom salts, 626.
 Ergot, 487.
 Eruptive fevers, 320.
 Erysipelas, 38, 320, 610.
 Esophagus (see Oesophagus).
 Examination of food, 482.
 — nose, 158.
 Examining moisture of air, 507.
 Exanthems, 321, 457.
 Exercise, 524.
 — in consumption, 343, 349.
 — pregnancy, 252.
 — puberty, 279.
 Expectorant, 610.
 Expectoration, 556.
 Extra fingers or toes, 144.
 Exophthalmic goitre, 172.
 Exudation, 2.
 Eye remedy, 629.
 Eyelids, eversion of, 153.
 Evils of education, 277.
 — fashion, 273.
 Eversion of the eyelids, 153.

 Facial neuralgia, 95.
 Fahrenheit, 594.
 Failure to nurse, 276.
 Faith, 645.
 — cures, 647.
 Falling of anus, 217.
 — sickness, 431.
 Fallopian tube, 270, 311.
 Faradization, 149.
 Farinaceous foods, 664.
 Fashion, 273.
 Fatty tumor, 62.
 Febricula, 321.
 Feces, 653.
 Feeding cup, 595.
 — by bowel, 345.
 — infant, 265.
 Feet, 619, 620.
 Felon, 37.
 Female characters, 269.
 Fetor of armpits and feet, 610.
 — of nose, 159.
 Fever, 319, 573.
 — autumnal, 321, 364.
 — Bengal, 364.
 — enteric, 321.
 — hay, 392.
 — hectic, 20.
 — intermittent, 363.
 — jungle, 364.
 — Levantine, 364.
 — malignant purpuric, 335.
 — petechial, 335.
 — relapsing, 325.
 — remittent, 362.
 — scarlet, 330.
 — spotted, 335.
 — thermic, 371.
 — typhoid, 321, 611.
 — typhus, 324.
 — mixture, 610.
 Fevers, 610.
 —, nursing in, 573.
 Fibrin ferment, 3.
 Fibroma, 62.
 Filaria, 482.
 Finger deformities, 44.
 First intention, 75.
 Fish, 665, 677.
 — to judge, 486.
 Fissure of anus, 213.
 — nipple, 173.
 Fistula, 21.
 — in ano, 212.
 Flat foot, 149.
 Flatulence, 419, 611.
 Flesh unfit for food, 471.
 Flies, 509.
 Floating kidney, 219.
 Fluid dram, drops in, 590.
 — measures compared, 593.
 Foie gras, 678.
 Fomentation, 563.
 Fomites, 520.
 Fontanelles, 128.
 Food and age, 670.
 — and disease, 471.
 —, assimilation of, 482.
 —, unwholesome, 493.
 Foods, 668.
 Foot baths, 642.
 — and mouth disease, 475, 496.
 — rot, 475.
 Fore-milk, 489.
 Foreign bodies in stomach, 194.
 Formaldehyde, 355, 579.
 Formalin, 355, 579.
 Fowl-cholera, 486.
 Fracture bed, 559.
 — of arm, 99.
 — ankle, 106.
 — collarbone, 99.
 — femur, 101.
 — fibula, 105.
 — humerus, 99.
 — jaw, 97.
 — kneecap, 103.
 — leg, 105.
 — patella, 103.
 — radius, 101.
 — ribs, 98.
 — skull, 120.
 — thigh, 105.

- Fracture of tibia, 105.
 Fractures, 96.
 Freckles, 463, 632.
 Friction, 564, 640.
 Frostbite, 32, 630.
 Fruit, to judge, 486.
 Fruits, 668, 669, 676.
 Fumigation, 579.
 Fungating ulcer, 25.
 Furuncle, 31.

 Gallstone, 200.
 Game, 486.
 Gangrene, 26.
 Gastric catarrh, 399.
 Gastritis, 399, 400.
 Gastric juice, 651.
 — ulcer, 404.
 Gastralgia, 405.
 Gathered breast, 313.
 Gelenkmaus, 134.
 Gelatin, 648.
 General care of sick, 561.
 General paresis, 445.
 Genu valgum, 145, 147.
 — recurvatum, 147.
 German measles, 331.
 Giving medicine and food, 543.
 Glanders, 57.
 Go, 658.
 Goitre, 171.
 Golden rule in consumption, 347.
 Gonorrhea, 239, 241.
 Grand mal, 431.
 Granulation, 75.
 Grapes, 476, 668.
 Gravel in urine, 421.
 Great white plague, 336.
 Greenstick fracture, 99, 100.
 Green sickness, 271.
 Gruel, 675.
 Gull's disease, 372.
 Gullet, 164.
 Gums, 136.
 Gymnastics, 523.

 Habit of constipation, 282.
 — — menstruation, 274.
 Hardened arteries, 468.
 Haemostasis, 34.
 Hallux valgus, 151.
 Hammer-toe, 151.
 Hands, chapped, 630.
 Hare-lip, 154.
 Hay asthma, 392.
 — fever, 392.
 Head deformed in rickets, 128.
 — diseases, 152.
 Headache, 285, 427, 611.
 — powders, 557.
 Healing by first intention, 75.
 — of wounds, 73.

 Heart, 679.
 Healthy food animal, 471.
 — disease, 467.
 — and rheumatism, 366.
 Heat, 4.
 Hectic fever, 20.
 Hematuria, 226.
 Hemophilia, 79.
 Hemorrhage in typhoid, 583.
 Hemorrhoids, 214.
 Hereditary consumption, 338.
 Heredity, 511.
 Hernia, 201.
 Herpes labialis, 155.
 — zoster, 453, 616.
 Hiccough, 611.
 Hip bone growing out, 141.
 Hip disease, 131, 134.
 Hives, 463.
 Hoarseness, 376, 381.
 Hodgkin's disease, 91.
 Hoffman's anodyne, 611.
 Hog-cholera, 478.
 Home gymnastics, 523.
 Homeopathy, 646.
 Hooftland's German bitters, 635.
 Horn, 69.
 Horse flesh, 485.
 Hostetter's Stomach Bitters, 635.
 Hot-air baths, 643.
 Hot bath for child, 563.
 — pack, 645.
 — stage of fever, 574.
 Household measures, capacity of, 590.
 House quarantine, 522.
 How to apply hot bottles, 563.
 — — avoid colds, 386.
 — — — consumption, 341.
 Hump back, 141, 184.
 Hydrotherapy, 323.
 Hydrocele, 234.
 Hydrophobia, 49.
 Hygiene of puberty, 278.
 — — sick room, 351.
 Hyperemia, 2.
 Hypertrophy of prostate, 229.
 Hyperidrosis, 619.
 Hypochondria, 447.
 Hysteria, 295, 442, 612.

 Idiosyncrasies, 548, 589.
 Ill fitting trousers, 235.
 Ills of fashion, 273.
 Immunity, 9, 317.
 Incontinence of urine, 223.
 Incubation periods, 320, 520.
 Indigestion, 399, 400.
 Indolent ulcer, 23.
 Infant, care of, 262.
 —, cry of, 262.
 Infants' breasts, 315.
 Infection, 34.

- Infectious diseases, 319.
 Inflamed joint, 130.
 Inflammation, 408.
 — acute, 2.
 — catarrhal, 11.
 — causes of, 6.
 — chronic, 13, 15.
 — croupous, 11.
 — diphtheritic, 11.
 — phlegmonous, 11.
 — plastic, 11.
 — syphilitic, 14.
 — treatment of, 12.
 — tubercular, 14.
 — of bladder, 221.
 — — bone, 124.
 — — bowels, 409, 416.
 — — breast, 174, 313.
 — — eyes, 614.
 — — lungs, 390.
 — — mouth, 164, 372.
 — — ovary, 307.
 — — testis, 233.
 — — tonsil, 374.
 Influenza, 335.
 Ingestion, 650.
 Ingrown toenail, 612.
 Inguinal hernia, 203.
 Injection, 545, 567.
 Injuries of abdomen, 190.
 — — arteries, 80.
 — — joints, 107.
 — — spine, 122.
 — to bones, 96.
 — — the brain, 118.
 — — nerves, 92.
 Inoculation, 9, 316.
 Insalivation, 650.
 Insanity, 271, 449.
 Insects and disease, 509.
 Insolation, 371.
 Instincts, 267.
 Intermittent fever, 363.
 Internal piles, 215.
 Intestinal obstruction, 208.
 Intestine, 195.
 Intestines, diseases of, 409.
 In the sick room, 538.
 Intussusception, 208, 210.
 Invasion, 576.
 Iron, 622.
 — tonic, 655.
 Ischio-rectal abscess, 211.
 Isolation in infection, 320.
 — periods, 320.
 Itch, 464.
 Itching, 256.

 Keefer, 659.
 Kidneys, 219, 678.
 Kinds of diet, 657.
 Kissing, 517.

 Koch, 317.
 Koumiss, 490, 659.
 Knock-knee, 145.
 Kyphosis, 143.

 Jaundice, 461.
 Jawbone affections, 156.
 Joints, 107.
 — diseases of, 129.
 Joint-felon, 477.
 — ill, 477.
 — mouse, 134.
 Jungle fever, 364.

 Laceration of urethra, 230.
 Lactometer, 489.
 Lait de poule, 664.
 La grippe, 334.
 Lake water, 505.
 Lander system, 647.
 Lardaceous disease, 20.
 Laryngitis, 376, 612.
 Lassitude, 271.
 Laxatives, 624.
 Lead lotion, 612.
 Lean meat, 651.
 Leprosy, 59.
 Leuchemia, 470.
 Leucorrhea, 293.
 Levantine fever, 364.
 Lice, 612.
 Lifting patient, 569.
 — — into bed, 560.
 Lime, chloride of, 360.
 Limewater, to make, 630.
 Linseed poultice, 567.
 Ling system, 647.
 Liniment, soap, 617.
 Lipoma, 62.
 Liquozone, 635.
 Liquid measure, 591.
 Lithates, 226.
 Lithemia, 226.
 Lithiasis, 226.
 Lithic acid, 226, 421.
 Lithotomy, 229.
 Liver, 200, 678.
 Lochia, 260.
 Lockjaw, 45.
 Locomotor ataxia, 444.
 Loose bodies in joints, 133.
 Lordosis, 144.
 Lorenz operation, 109.
 Loss of voice, 381.
 Lumbago, 371, 612.
 Lump-jaw, 59, 478.
 Lunacy, 429.
 Lungs, inflammation of, 390.
 Lupus, 56.
 Lying-in, 259.
 Lymph, 76, 408.
 Lymphadenitis, 89.

- Lymphadenoma, 63.
 Lymphangitis, 39.
 Lymphatic glands, 89.
 Lysis, 6, 574.

 Mad dog, 49.
 Malaria, 613, 363.
 Male characters, 269.
 Malignant ulcer, 25.
 — purpuric fever, 335.
 Malposition of testis, 233.
 Malt liquors, 674.
 Management of pregnancy, 251.
 Mallet finger, 145.
 Mammals, 268.
 Mania, 451, 613.
 Margarine, 491.
 Marriage, 298.
 Mastication, 650.
 Mastitis, 174.
 Massage, 639.
 Meals, 656.
 Meats, 678.
 Meat inspection, 499.
 — broths, 660.
 Means of spread of diseases, 576.
 Measles, 320, 331.
 Measly pork, 481.
 Measles in pig, 480.
 — German, 331.
 — nursing, 580.
 Media, 317.
 Medical advice, 587.
 — diseases, 316.
 Medicine chest, 595.
 Medicines, 546, 588.
 Medicines, patent, 634.
 — classified, 597.
 Melon seed bodies, 133.
 Melancholy, 447, 451.
 Menorrhagia, 287.
 Menstruation, 270, 309.
 Menstrual disorders, 285.
 Mental alienation, 449.
 Meningitis, 335.
 Meningitis, spinal, 124.
 Metatarsalgia, 152.
 Metric weights, 591.
 Metrorrhagia, 287.
 Midwifery, 257.
 Milk, 658, 677.
 — and disease, 484.
 — fever, 259, 477.
 — in infant's breast, 313.
 — keeping, 324.
 — leg, 262.
 — inspection, 500.
 — of lime, 361.
 — sugar, 659.
 — to judge, 489.
 — watered, 489.
 Mind, unsoundness of, 449.

 Miscarriage, 254.
 Mode of administering medicine, 589.
 Modes of diphtheria infection, 332.
 Modified milk, 660.
 Moisture and temperature, 507.
 Mother's milk, 57.
 Morning sickness, 248, 613.
 Morphine fiend, 287.
 Morton's disease, 156.
 Mortification, 408.
 Mouth, 164.
 Mouth breathing, 162.
 Movable kidney, 217.
 Morbilli, 331.
 Mosquitoes, 365.
 Mumps, 166, 320, 334, 580.
 Mustard plaster, 562.
 Muscular rheumatism, 365, 613.
 Muscle tumor, 62.
 Mushrooms, 676.
 Myoma, 62.
 Myxoma, 62.
 Myositis, 139.
 Myxedema, 372.

 Nautical measure, 591.
 Narrowing of intestine, 195.
 Nasal polypi, 161.
 Naso-pharynx, examination of, 158.
 Natural cure, 20.
 Nausea, 406.
 Necrosis, 125.
 Needles, 71.
 Nephritis, 423.
 Nervous affections, 92.
 Nervous cordials, 638.
 Neuralgia, 94, 428, 613.
 — of testis, 236.
 Neuralgic joints, 134.
 Nettle rash, 463.
 Nervous system, 427.
 Nevus, 82, 87.
 Neuroma, 63.
 Non-survival of fittest, 277.
 Nose-bleed, 163.
 Nose wash, 613.
 Nose, examination of, 158.
 Number of drops in drachm, 590.
 Nurse, 531.
 Nursing the helpless, 569.
 Nutrient enemata, 633.
 Number of pints, 636.
 Necrosis, 125.
 Nuts, 669, 676.
 Nutritive injections, 545.
 Nutritive principles, 674.

 Oatmeal, 488.
 Observatiou of sick, 548.
 Obstetrics, 247.
 Obstruction of intestine, 208.
 Odontoma, 63.

- Offensive odor of feet, 619.
 Oleomargarin, 491.
 Old age, 513, 635.
 On fevers, 573.
 Open wounds, 561.
 Openings in baby's head, 128.
 Ophthalmia, 614.
 Opium, 557.
 Orange, 669.
 Orchitis, 233.
 Organs, female, 266 to 315.
 Osteomyelitis, 125.
 Osteoma, 62.
 Osteitis, 124, 127.
 Outfit for confinement, 257.
 Ovary, diseases, 307.
 Ovaritis, 307, 388.
 Ovum, 247.
 Ozena, 159.

 Pack, 644, 645.
 Paget's disease, 174.
 Pain, 554, 586.
 Pain in head, 153.
 Pain in inflammation, 4.
 Pain, referred, 185, 398.
 Pain in side, 619.
 Pain in stomach, 405.
 Paine's celery compound, 635.
 Painful menstruation, 285, 310.
 Palate, cleft, 167.
 Pallor, 271.
 Palpitation, 271.
 Papillomata, 63.
 Papular eruption, 457.
 Paralysis, general, 452.
 Paralytic dementia, 445.
 Paresis, general, 445, 452.
 Parker's tonic, 635.
 Parrish's food, 147.
 Partial pack, 645.
 Pasteur treatment, 51.
 Pastry, 669.
 Patent medicines, 318, 350, 634.
 — medicine vendors, 292.
 Patient not responsible, 539.
 Pearl disease, 476.
 Peas, 668.
 Peculiarities towards medicines, 548.
 Pepsin, 651.
 Percussion, 641.
 Perforating ulcer, 25.
 Pericementitis, 396.
 Periods of incubation, 320.
 — of isolation, 320.
 Periostitis, 124, 127.
 Peritoneum, 191.
 Peritonitis, 191, 410.
 — in typhoid, 583.
 Perspiration of feet, 619.
 Petrissage, 640.
 Petechial fever, 335.

 Petit mal, 431.
 Phagocytic, 3.
 Phagocytosis, 10.
 Pharmacopoea, 588.
 Pharyngitis, 614.
 Phelps' box, 189.
 Phlebitis, 82, 83.
 Phlebolith, 86.
 Phlebotomy, 88.
 Phlegmasia, 262.
 Phosphate in urine, 226.
 Phthisis, 336, 614.
 Pig typhoid, 478.
 Pigeon breast, 128.
 Piles, 214.
 Pimples, 601.
 Plague, 361.
 Plague, Great Black, 239.
 Plague, Great White, 336.
 Plaster jacket, 188.
 Pleuro-pneumonia, 472.
 Pleurisy, 390.
 Plummer's pill, 614.
 Pneumococcus, 391.
 Pneumonia, 336, 390, 472, 614.
 Pocket spit flask, 341.
 Poisoning, 496.
 Polydaactylism, 144.
 Polypus of nose, 161.
 Pork, 667.
 Porridge, 675.
 Port, 676.
 — wine stain, 87.
 Posture of patient, 553.
 Potatoes, 668.
 Pott's disease, 183.
 — fracture, 106.
 Poultice, 566.
 — in inflammation, 12.
 Poultry, 485.
 Precautions against spread of disease, 576.
 Precocity, 273.
 Predigestion, 659.
 Pregnancy, 247, 406.
 — tubal, 311.
 Preparation for case of accident, 558.
 Preparing for doctor, 560.
 Prescription, 589, 601.
 Presence of mind, 584.
 Pressure gangrene, 29.
 Prevention of consumption, 341.
 — of disease, 510.
 — of toothache, 398.
 — of typhoid, 323.
 — of women's diseases, 267.
 Priapism, 278.
 Primary union, 75.
 Prolapse, 312.
 Prolapsus ani, 217.
 — recti, 217.
 — uteri, 312.

- Proof of vaccination, 328.
 Proprietary medicines, 635.
 Prostate, 229.
 Protection of spinal cord, 123.
 Pomitus, 256.
 Psoroptes ovis, 476.
 Ptyalin, 650.
 Puberty, 238, 268, 270.
 — delayed, 283.
 — hygiene of, 278.
 Puerperal fever, 261, 477.
 Pulmonary consumption, 614.
 — tuberculosis, 336.
 Pulse, 548.
 — rates, 549.
 Pulses, 675.
 Pure drugs, 596.
 Purgatives, 599, 615, 623, 624.
 Purpuric fever, 335.
 Putrid meat, 493.
 Pyemia, 43.
 Pyogenic.
 Pyorrhea alveolaris, 157.
 Pyrosis, 405, 601.
 Quantity of urine, 422.
 Quacks, 292, 636.
 Quack medicines, 636.
 Quarantine, 580.
 Quarantine periods, 575.
 Qualities of nurse, 533.
 Quicklime, 361.
 Quiet, 541.
 Quinine, 557.
 Quinsy, 373, 374, 478, 632.
 Rabies, 49.
 Race and puberty, 283.
 — suicide, 267.
 Rain water, 503.
 Rarefaction of bone, 125.
 Rashes, 320.
 Rats, 510.
 Ray fungus, 59, 478.
 Reading to patients, 542.
 Reaumur, 594.
 Red soldier, 478.
 Redness, 5.
 Reduction of diseases, 317.
 — — a dislocation, 111.
 Referred pain, 185, 398.
 Relation of metrical to U. S. P. measures, 591.
 Relaxed throat, 382.
 Remittent fever, 365.
 Removing patient's clothes, 560.
 Renal colic, 220.
 — calculus, 220.
 Rennet, 659.
 Rennin, 651, 652.
 Repair, 3.
 — of wounds, 73.
 Reproduction, 268.
 Resisting power of tissues, 10.
 Resolution, 4, 408.
 Respiration, 548.
 Respiratory tract, 372.
 Retention of urine, 225, 231.
 Retraction of nipple, 181.
 Rheumatism, 365, 612, 613, 615.
 Rhinoscopy, 158.
 Rib in neck, 140.
 Richardson's sherry bitters, 635.
 Rickety rosary, 128.
 Rickets, 127, 140, 615.
 Riggs' disease, 157.
 Rigor, 18, 455, 556, 574.
 Ringworm, 460.
 River water, 505.
 Roasting, 668.
 Rodent ulcer, 25, 63, 66.
 Roentgen rays, 72.
 Room for sick, 558.
 Roseola, 320.
 Rot in sheep, 477.
 Rötheln, 331.
 Round shoulders, 163.
 Roup, 485.
 Rubella, 331.
 Rubeola, 320, 331.
 Rules for school children, 318.
 Rules to avoid disease, 318.
 Rupture, 201.
 Russell's stretcher, 569.
 Sal volatile, 615.
 Salicine, 368.
 Salicylate of soda, 368.
 Salicylic acid, 368.
 Salivary glands, 166.
 Salt rheum, 459.
 Salted meats, 667.
 Sand in urine, 621.
 Sanitation, 471.
 Santonin, 622.
 Sappremia, 41.
 Sarcoma, 62.
 Scab, 76.
 Scabies, 464.
 Scald head, 462.
 Scalds, 33, 630.
 Scales, 458.
 Scar, 74, 77.
 Scarlatina, 320.
 — and milk, 497.
 Scarlet fever, 320.
 — — nursing, 581.
 Schools, Consumption and, 344.
 Sciatica, 95, 429, 615.
 Scirrhus ulcer, 25.
 Scirrhous, 67.
 — of breast, 180.
 Scoliosis, 140.
 Scrofula, 615.
 Sea-level, 357.

- Sea-sickness, 455, 629.
 Second intention, 75.
 Secret vice, 291.
 Seidlitz powder, 616.
 Self-preservation, 267.
 Senna, 623.
 Separated milk, 490.
 Sepsis, 34.
 Septic process, 8.
 Septicemia (blood-poisoning), 41.
 Setting a dislocation, 111.
 Sex, 268.
 — characteristics, 269.
 Shake the bottle, 547.
 Sheep scab, 476.
 Sheet salt, 644.
 Sheets, changing, 570.
 Shell-fish, 677.
 Sherry, 674.
 Shingles, 453, 616.
 Ship fever, 320.
 Sick, care of, 531.
 Sickroom, 577.
 — hygiene of, 357.
 Sickness, sea, 455.
 Signs of inflammation, 4.
 Sinapism, 562.
 Signs of pregnancy, 247.
 Sinus, 21, 127.
 Skin affections, 457.
 — diseases, 616.
 — grafting, 24.
 Skim milk, 660.
 Sleep in disease, 554.
 Sleeplessness, 600, 616.
 Slop diet, 664.
 Smallpox, 320, 325, 515.
 — nursing, 580.
 Smut, 487.
 Soap liniment, 617.
 Social evil, 239.
 Solomon's Balm of Gilead, 638.
 Solutions, to make, 594.
 Sore throat, 373, 614, 628.
 — — clergyman's, 382.
 Soups, 663.
 Sour stomach, 651.
 Sources of water, 501.
 Spasm, 456.
 — of the heart, 469.
 — — esophagus, 169.
 Special care against diseases, 514.
 Special danger in lying-in, 261.
 — meats, 678.
 Specifics, 638.
 Sphere of woman, 297.
 Spina bifida, 183.
 Spinal curvature, 183.
 — cord, protection of, 123.
 — meningitis, 124.
 Spine, 183.
 — deformities, 140.
 — injuries of, 122.
 Spit and consumption, 340.
 — flask, 341.
 Spittoon, 318.
 Splay foot, 149.
 Sponging, 562.
 Sporadic, 316.
 Spotted fever, 335.
 Sprains, 107, 123.
 Spring water, 504.
 Sputum, 339.
 — to destroy, 340.
 Standard disinfectant, 360.
 Starting of the navel, 205.
 Steam baths, 643.
 Stenosis of intestine, 195.
 Sterility, 266, 271.
 Stiff neck, 139.
 Stimulant, 604.
 Stomach, 399, 673.
 Stomach affections (surgical), 194.
 — cancer of, 404.
 — dilatation of, 405.
 — sour, 601.
 Stomatitis, 164, 372.
 Stone in bladder, 227, 427.
 — — kidney, 220.
 Stools, 411.
 Stoppage of urine, 426.
 Strains, 107.
 Strangles, 478.
 Strangury, 426.
 Strangulated hernia, 207.
 Strawberry tongue, 330.
 Stricture of esophagus.
 — — urethra, 231.
 Struma, 615.
 Strychnine, 557.
 Stunning, 118.
 St. Vitus, dance, 434.
 Substitute for vegetables, 668.
 Sudden illness, 558.
 Sugar, 675.
 — diabetes, 420.
 — of milk, 659.
 Sulphur to disinfect, 354.
 —, to use, 579.
 Sunburn, 630.
 Sunstroke, 371.
 Supernumerary digits, 144.
 Supplemented beef tea, 662.
 Suppression of menses, 287, 288, 310.
 Suppuration, 4, 16.
 Susceptibility, 317.
 Swallowing objects, 169.
 Sweetbread, 679.
 Swelling, 5.
 Symptoms of consumption, 347.
 Symptoms of inflammation, 6.
 Synovitis, 129.
 Syphilis, 80, 239, 241, 617.
 System in nursing, 538.

- Tabes dorsalis, 444.
 Table of fevers, 575.
 — — rashes, 320.
 Tables of weights and measures, 591, 592, 593, 594.
 Talipes, 168.
 Tape worm, 480, 481, 617, 671.
 Tapotement, 641.
 Tapping, 641.
 Tarsal cyst, 154.
 Tea, to judge, 492.
 Teeth, 394.
 — of rickety children, 128.
 Telescoping of intestine, 208.
 Telling children of birth, 302.
 — patient of his danger, 539.
 Temperature of patient, 548.
 —, to change scale, 594.
 Tender feet, 619.
 Termination of fever, 574.
 Termination of inflammation, 4.
 Test for albumen, 424.
 — for sugar, 425.
 Testicle, 233.
 Testis, 233.
 Tetanus, 45.
 Therapeutics, 588.
 Thermic fever, 371.
 Thin blood, 470.
 Thirst, 557.
 Throat, 164.
 Thrombosis, 2, 82.
 Thrush, 164, 373.
 Thyroid body, 171.
 Tic douloureux, 95.
 Tight boots, 152.
 Time for marriage, 301.
 — of digestion, 656.
 — — labor, 249.
 Tinea favosa, 617.
 Tinned goods, 487.
 To avoid catching cold, 386.
 — feed helpless patient, 571.
 — give a child a hot bath, 563.
 — judge corn, wheat, etc., 487.
 — — meat, 482.
 — prevent disease, 318.
 Toe-nail, ingrown, 612.
 Tolerance, 589.
 Tongue, 165, 557, 679.
 Tongue-tie, 165.
 Tonics, 599, 621.
 Tonsillitis, 374.
 Too many meals, 656.
 Tooth abscess, 124.
 Toothache, 157, 394, 617.
 Torticollis, 139.
 Toxemia, 35.
 Transillumination, 158.
 Traumatic gangrene, 28.
 Trichina spiralis, 479.
 Trichiniasis, 479, 618.
 Tripe, 679.
 Trismus, 47.
 Truss, 204.
 Tubal pregnancy, 311.
 Tubercle, 54.
 Tubercular consumption, 336.
 — inflammation, 14.
 — peritonitis, 193.
 Tuberculosis, 53, 80, 336, 476, 485.
 — in milk, 496.
 — of bone, 126.
 — — bowel, 57.
 — — joints, 131.
 — — spine, 183.
 Tubes, Fallopian, 311.
 Tumors, 60.
 — in bone, 129.
 — of brain, 152.
 — — eyelids, 153.
 — — ovary, 308.
 — — salivary glands, 167.
 Typhoid fever, 320, 321, 514, 611.
 — and milk, 498.
 — nursing, 582.
 Typhus, 320.
 — nursing, 583.
 Ulcer, gastric, 404.
 Ulcer on tongue, 165.
 Ulcerated tooth, 156.
 Ulceration, 4, 22.
 Unhealthy blood, 7.
 Unwholesome vegetables, 494.
 — food, 493.
 Unsoundness of mind, 449.
 Urates, 226.
 Urea, 421.
 Urine, 226, 421, 556.
 — incontinence of, 223.
 — stoppage of, 426.
 — retention of, 225, 231.
 — in pregnancy, 254.
 Uric acid, 226, 421.
 Urinals, 572.
 Urinary deposits, 226.
 — system, 420.
 Urticaria, 463, 618.
 U. S. P., 588.
 Useful prescriptions, 601.
 Urethra, 219.
 Uterus, 311.
 Vaccination, 327.
 Vaccinia, 327.
 Varioloid, 327.
 Value of beef tea, 661.
 Vapor bath, 642.
 Varix, 82, 85.
 Variola, 320, 325.
 Varicella, 320, 329.
 Varioloid disease, 475.
 Varicocele, 235.

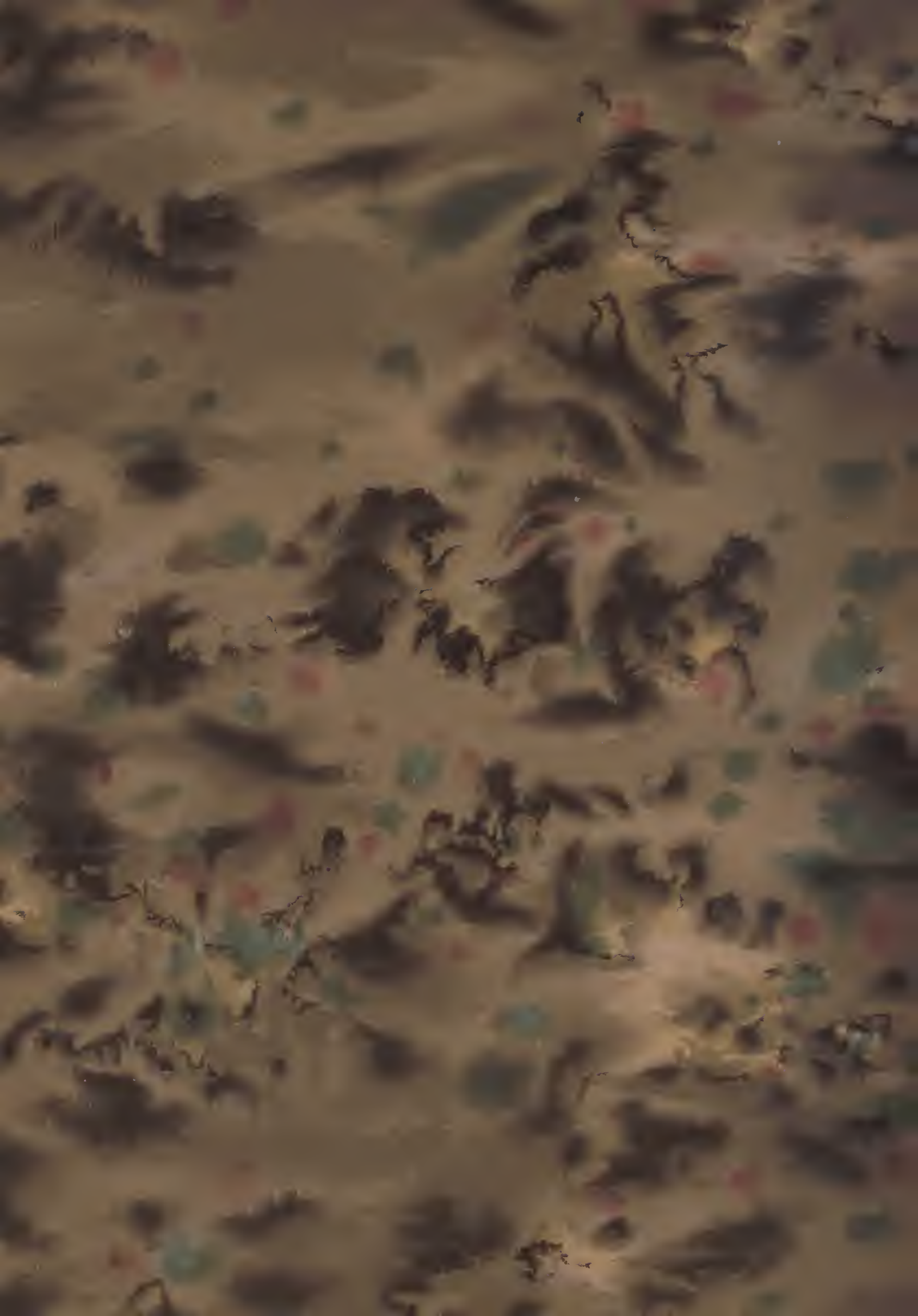
- Varicose ulcer, 23.
— veins, 85.
Veal, 667.
Vegetable kingdom, 675.
Vegetables, 668.
— to judge, 486.
Veins, 82.
Vein-stone, 86.
Venereal diseases, 237.
Vivisection, 88.
Venison, 667.
Vertigo, 618.
Vesicular eruption, 457.
Vice, secret, 291.
Vicarious menstruation, 289.
Vital signs, 548.
Voice, loss of, 381.
Volvulus, 208.
Vomiting, 197, 206, 208, 406, 557, 613, 618.
— of pregnancy, 252.
Von Graefe's sign, 172.

Waiting for the doctor, 584.
Warts on legs, 155.
Washing nose, 160.
Water, 502.
Watery blood, 470.
Water breast, 405.
Watered milk, 489.
Weakness of bladder, 224, 426.
Weak heart, 7.

Weight, 591, 592.
Weir Mitchell, 646.
Webbed finger, 145.
Well water, 504.
Whey, 659.
White plague, 336.
Whites, 293.
White swelling, 131.
Whitlow, 37.
Whole milk, 660.
Whooping cough, 334, 618.
Whiskol, 635.
Widal test, 322.
Wind-mill exercise, 527.
Wines, 674.
Womb, 311.
Woman's place, 297.
— sphere, 297.
Women, diseases of, 266.
Woolsorters' disease, 52.
Worms, 619.
Wounds, 71.
Wounds of tongue, 165.
Wound inflammation, 34.
Wrist drop, 93.
Wry neck, 139, 371.

X-rays, 72.

Yeast poultice, 567.





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